

***I-405***  
***CORRIDOR PROGRAM***

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**I-405 CORRIDOR PROGRAM  
BACKGROUND REPORT**

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# I-405 CORRIDOR PROGRAM I-405 CORRIDOR PROGRAM BACKGROUND REPORT

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# I-405 Corridor Program Background Report

This draft report summarizes transportation, demographic, and environmental characteristics of the I-405 corridor. The report highlights existing physical and operational factors that will influence the selection of alternative packages of transportation improvements in the corridor. The report also identifies land use growth trends. Technical working papers referenced in this document provide additional details regarding the background conditions. The previously published *Framework Report* and associated working papers describe the Corridor Program's decision-making structure and process, including national examples of comparable processes.

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## Chapter 1: Program Overview



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### Program Objective

The objective the I-405 Corridor Program is to identify and establish a reasonable and feasible package of transportation improvements and actions that best meet future travel needs in the corridor over the next 20 to 30 years.

The expected outcome will be an efficient, integrated, and multi-modal system of transportation improvements that is consistent with regional land use and transportation planning of the region's Metropolitan Planning Organization and which:

- provides operational reliability and a reasonable level of service for personal, transit, and freight mobility throughout the I-405 corridor;
- supports a vigorous state and regional economy by responding to travel needs over the next 20 to 30 years;
- provides flexible and cost-effective transportation options to accommodate planned growth in the corridor; and
- contributes to enhanced livability within affected communities in the corridor as measured by effects on the natural and built environments.

The I-405 Corridor Program EIS will include a broad community involvement program and environmental review under NEPA and SEPA. The level of environmental analysis will be sufficient to identify significant differences in performance, impacts, and opportunities for mitigation among each alternative or package of solutions, and to support decision-making at the Federal, State, regional, and local levels. A comprehensive community involvement program will be closely coordinated with the environmental process to encourage significant stakeholder participation and ownership

of the study results. The solutions and actions identified in the preferred alternative will be proposed for adoption into local, regional, State, and Federal transportation programs.

## Study Area

The study area for the I-405 Corridor Program is divided into primary and secondary areas (see **Figure 1: Study Area Boundaries**). The primary study area defines the boundaries within which the range of alternatives will be identified; the secondary study area denotes a much broader area within which indirect and cumulative environmental impacts of the alternatives may be evident. The primary study area includes the Cities of Bothell, Woodinville, Kirkland, Redmond, Bellevue, Mercer Island, Newcastle, Renton, and Tukwila, as well as portions of the Cities of Lynnwood, Issaquah and Kent, and adjacent unincorporated areas of King and Snohomish counties. The secondary study area is contiguous with the East King County Corridor Needs Study. It encompasses East King County, Seattle, South Snohomish County and North Pierce County. To the extent that the I-405 Program or related efforts identify potential alternatives within the secondary study area, the primary study area can be enlarged to accommodate such alternatives.

## History of I-405 Planning Efforts

The I-405 Corridor Program follows and builds upon several past planning efforts over the last two decades. To a large extent, those past planning efforts have shaped the general direction of this Program. Therefore, it is important for the public and decision-makers to understand the issues that were addressed in those previous planning efforts and to view the I-405 Corridor Program in the context of the I-405 planning history.

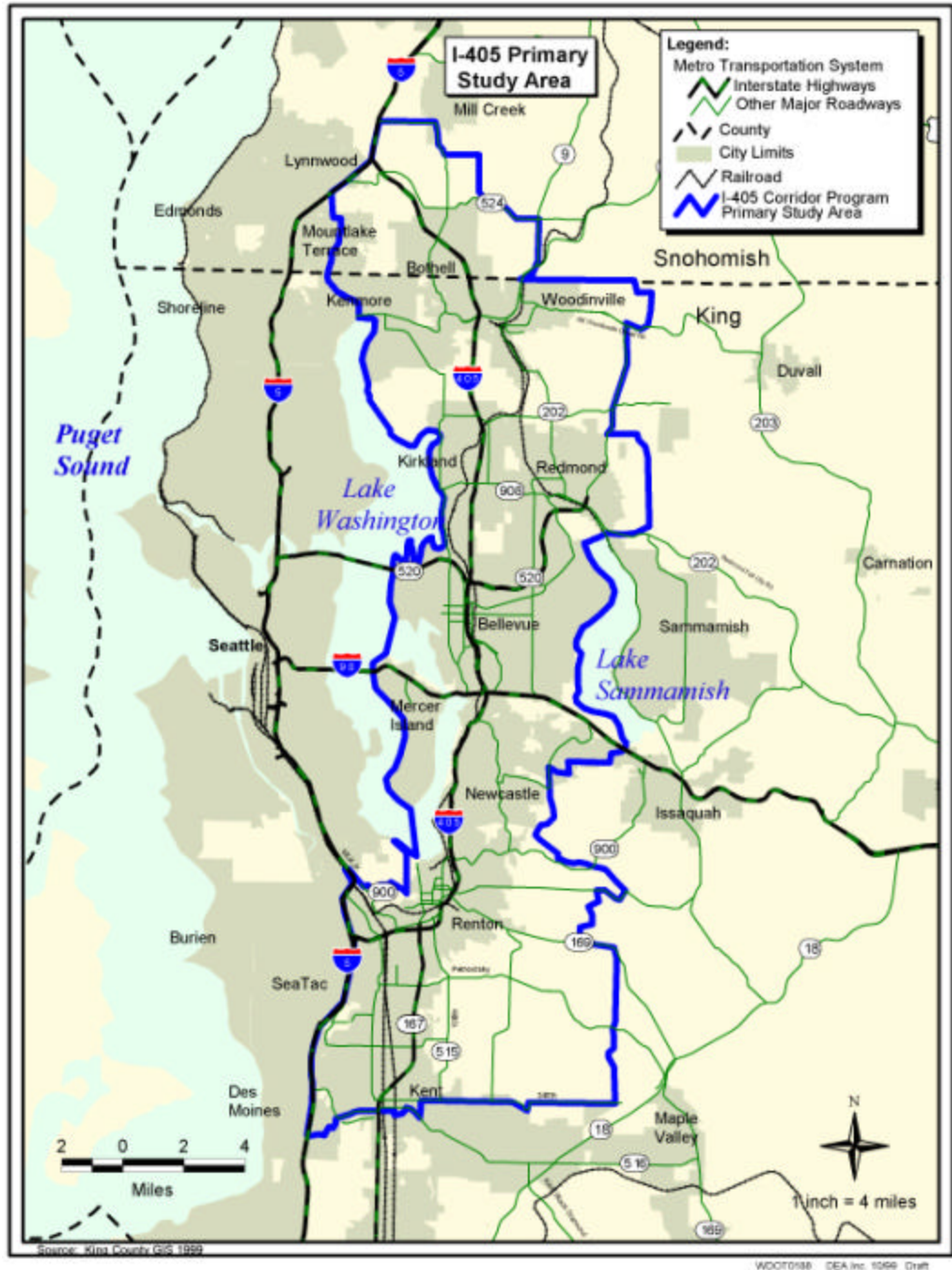
## Early Efforts

The serious planning for the future of I-405 began when the Eastside cities, King and Snohomish Counties and regional agencies such as Metro, the Puget Sound Council of Governments (PSCOG), the predecessor of the Puget Sound Regional Council) and WSDOT, formed the Eastside Transportation Program (ETP) in the mid 1980s. Since that time, the ETP, along with its companion organizations- the South King County Area Transportation Board (SkatBd) in South King County, and Snohomish County Tomorrow, have been the forums to address transportation issues and problems related to the I-405 study area.

The first major task of the ETP in the late 1980s was to develop a long-range transportation plan (for the year 2000) covering the entire Eastside area. When the traffic projections were made through a travel demand model, the ETP study found that I-405 would be heavily congested along the entire corridor by the year 2000 if no capacity was added. The ETP's technical committee recommended that one general purpose lane in each direction be added from I-5 in Tukwila to I-5 in Lynnwood. The ETP conducted an

extensive public outreach program to solicit input from the general public on the proposed ETP plan. At that time, many participants in the public meetings remained unconvinced of the need for the general purpose capacity expansion.

**Figure 1: Study Area Boundaries**



Reflecting this public sentiment, the ETP decision-making Steering Committee, consisting of mostly elected officials, did not endorse the proposed general purpose capacity expansion. Instead, it adopted a policy directing WSDOT and local jurisdictions to conduct a study to analyze the feasibility of HOV and high capacity transit expansions in the I-405 corridor.

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## Puget Sound Regional Planning

Since the late 1980s, cities and counties in the central Puget Sound region have been working together to manage the region's rapid growth. This cooperative planning was advanced by the passage of the State Growth Management Act (1990) and the adoption of Vision 2020, the regional growth and transportation strategy in 1990 (amended in 1993 and 1995). The primary strategy of Vision 2020 seeks to manage growth by concentrating it in existing urban areas. Doing so would help to slow suburban sprawl, keep existing city and town centers vital, and allow transportation and other services to be provided more efficiently. A key element of this urban growth strategy is to encourage more development in Urban Centers.

Within the four central Puget Sound counties, 21 Urban Centers have been designated, of which 12 are located in King County. The I-405 Corridor Program study area includes 6 Urban Centers, half of the King County total. Those Urban Centers in the study area are:

- Tukwila
- Renton
- Downtown Bellevue
- Downtown Redmond
- Canyon Park in Bothell
- Lynnwood

(To be designated for a Urban Center, an area must satisfy at minimum the following criteria: 25 to 80 employees per acre, 10 to 20 households per acre and 15,000 to 300,000 employees. It is a place that includes a dense mix of business, commercial, residential, and cultural activity within a compact area of up to 1.5 square miles.)

Vision 2020 acknowledged that the development potential of the adopted Urban Centers could not be realized in the absence of transportation facilities to support developments. Accompanying Vision 2020, the Metropolitan Transportation Plan (MTP) was prepared in the mid 1990s to support this growth strategy. The MTP calls for balanced transportation system. This balance would be achieved in part by shifting future investment emphasis from highways and single occupancy vehicle movement to transit, people, and goods movements. (While the MTP was being prepared, a subregional I-405 study, called the *I-405 Multimodal Corridor Program (MCP)* was initiated. The MCP is discussed further below). While the MTP acknowledged the ongoing planning efforts of the I-405 Multimodal Corridor Program, the MTP did not list specific I-405 facility improvements except for those already in the adopted WSDOT program, such as the core high occupancy vehicle (HOV) lanes and ramps.)



In the mid 1990s, the Eastside Transportation Program evolved into the Eastside Transportation Partnership (ETP), a coalition of public agencies from the Eastside working together to address transportation issues. During 1997, ETP developed Mobility Action Priorities (MAP), a concerted effort to identify transportation projects from adopted plans that would be most effective in improving mobility and addressing peak hour traffic congestion throughout the Eastside. The 117 projects, with an estimated cost of \$1.36 billion, were recommended based on the following key concepts, or cornerstones:

- Completion of the transportation network, including policies that support the preservation of corridors and rights-of-way to complete the transportation network, and that direct the Eastside cities to contribute to and participate in the I-405 Corridor Program and the Trans-Lake Washington Study.
- HOV system completion, including direct access improvements.
- Improved transit service and alternatives to single occupant vehicles.
- Regional High Capacity Transit, including the development for Phase 2 of the Regional Transit Authority's Sound Move initiative.

The ETP Mobility Action Priority project list specifically includes the I-405 Corridor Program with anticipated program development cost of \$2 million.

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## I-405 Multimodal Corridor Program (MCP)

The I-405 Multimodal Corridor Program (MCP), initiated in the mid 1990s, is the direct predecessor of this I-405 Corridor Program. The I-405 MCP grew out of a common concern among local jurisdictions that participated in the ETP and business groups about growing congestion in the I-405 corridor. As noted above, in the early 1990s, the ETP recommended that WSDOT initiate a transportation study of the corridor.

Phase 1 of the I-405 MCP identified issues and concerns, as well as existing travel conditions within the corridor. Phase 2 focused on travel demand modeling to identify the types of users in the corridor and their travel characteristics. Phase 2 also identified the factors that contribute to congestion in the corridor. Using this information, ten "pure" transportation alternatives were modeled, including various levels of freeway and arterial general purpose capacity expansion, transit, Travel Demand Management (TDM) and Transportation System Management (TSM). Three additional alternatives were modeled by combining complementary elements from several "pure" alternatives. The I-405 MCP concluded that there is no single solution to solving the I-405 corridor congestion, but that a multimodal approach is necessary to address the diverse travel markets in the corridor. The MCP also acknowledged the need for a more complete public involvement process and more detailed environmental evaluation of corridor impacts, prior to reaching a decision about the future of the I-405 corridor. The I-405 Corridor Program is the response to that need.

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## Chapter 2: Corridor Development and Growth

Construction in the early 1960s of Interstate 405 provided a freight bypass for Interstate 5 through Seattle, but it also opened the Lake Washington countryside to increased development. Approaching the end of the century, I-405 has changed dramatically from a Seattle bypass to become the roadway of choice for most north-south trips for the area east of Lake Washington. More than two-thirds of the total trips on I-405 begin and end within the corridor itself. The remaining one-third have strong ties with the communities along SR 167 and the developing areas to the east. Less than one percent of vehicle trips travel from one end of I-405 to the other.

With I-405 as the backbone of the Lake Washington communities' transportation system, the growing traffic congestion along the corridor has serious implications for personal and freight mobility, the economy, the environment and residents' quality of life. Growth projections suggest that the problem will worsen in the future. Total vehicle miles of travel in 2020 will be 37% higher than 1990. Absent any major investment in the corridor between now and 2020, PM peak period travel delay will increase 250% on I-405 and 350% on local arterials between 1990 and 2020 (source: *I-405 Multimodal Corridor Technical Report (April 1998)*).



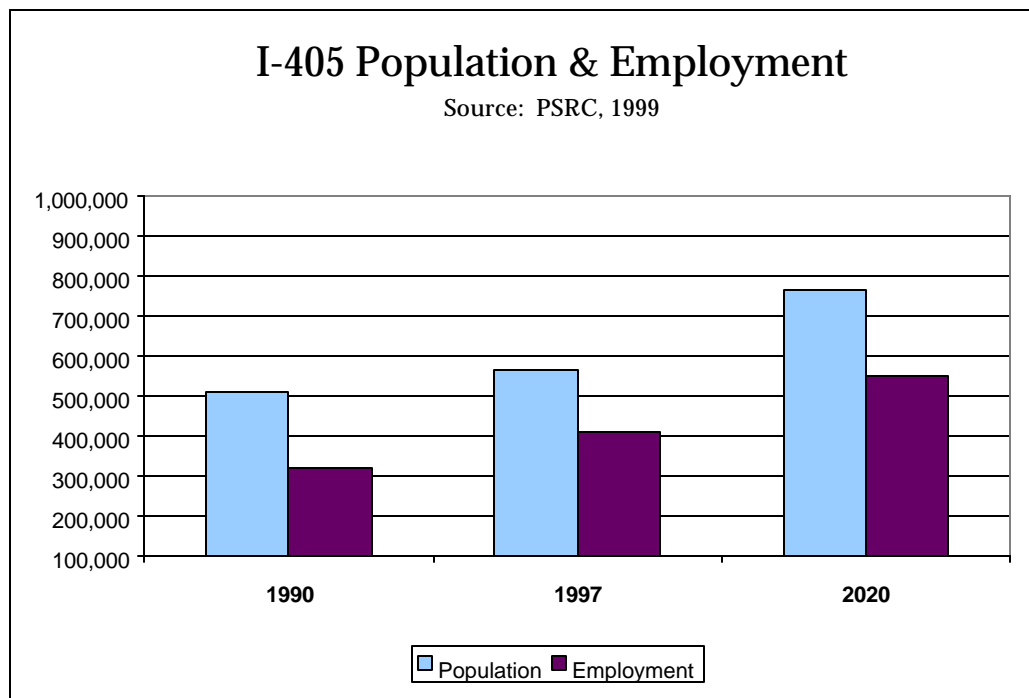
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### Study Area Population, Employment, and Households

Between 1970 and 1990, communities in the area impacted by I-405 grew much faster than the Central Puget Sound Region as a whole. Over the 20-year period, employment in the affected area increased over 200% from 94,500 to 323,175 and population rose 78 percent from 285,800 to 508,560.

As shown in **Figure 2**, population and employment have continued to grow during the 1990's; in particular, employment has grown at an annual rate of almost 3.5%. Looking ahead, growth in the corridor area through 2020 will likely keep pace with the regional growth in the Puget Sound region. The I-405 corridor population and employment growth will increase by over 35% during the 23-year period. By 2020 an additional 144,000 people are forecast to be employed within the study area, while the population is expected to reach approximately 765,000, an increase of more than 200,000 people from 1997. This growth equates to around 1.3 % annually. Although this is a slower rate of growth than has been experienced during the past 30 years, this conservative estimate results in a significant growth in traffic in an already congested corridor.

**Figure 2: Population and Employment in the Study Area**



Source: Puget Sound Regional Council

<sup>a</sup> 1997 figures are estimated using TAZ 2000 projections and applying proportions to FAZ 1997 estimates

<sup>b</sup> Excludes resources (agriculture, forestry, fishing, and mining) and construction.

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## Study Area Compared to 4-County Region

In recent years, the I-405 study area has increased its role as a regional employment center. As shown in **Table 1**, the study area's share of regional employment increased from 22.4 percent in 1990 to 24.6 percent in 1997. No change in the study area's percentage of regional employment is forecast.

Although the study area population and households have experienced considerable growth, they have declined slightly as a percent of the four-county total in recent years, in part because the study area's housing stock is relatively high priced. In the years ahead, the percentage of the region's population and households within the study area is forecast to remain about what it is today.

The trend to increased service employment at the expense of manufacturing is evident throughout the region. The study area's share of total regional manufacturing is expected to decline slightly to fewer than 30 percent in 2020. This has implications for travel demand as, in general, manufacturing facilities generate fewer trips per employee than retail or service businesses. Retail businesses generally generate the most trips of all the business types, and the I-405 study area has a greater share of four-county retail employment than total employment. Thus, we can expect somewhat greater travel demand per employee within the study area compared to the rest of the region.

**Table 1: I-405 Study Area as Percent of 4-County Region**

	Year		
	1990	a	
Population		18.1%	
Households		18.1%	
Employment			
	25.5%		26.8%
b		25.0%	
Government/Education		10.3%	
WTCU	26.6%		30.4%
	31.6%		29.2%
d		24.6%	

Source: Puget Sound Regional Council

1997 figures are estimated using TAZ 2000 projections and applying proportions to FAZ 1997

b

c

d

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## Major Employers

There are several major private-sector employers located in the study. The Boeing Co. employs over 21,000 people with its operations in Renton and employees on the Eastside. Microsoft employs approximately 10,900 people at its Redmond campus headquarters and various other locations in the study area. Hospitals

Hospital Medical Center and Overlake Hospital Medical Center employ 1,600 each, while Valley Medical Center in Renton and Group Health Cooperative of Puget Sound add

continues to grow with the boom of the Internet and personal communication services technology. Combined, AT&T Corp., US West Corp. employ a total of over 3,000 people on the Eastside.

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## Travel Characteristics and Growth

Travel in the I-405 study area can be characterized in terms of trip growth, the purpose of the travel, the distribution of travel, and trip lengths. Among the major findings of this

**Rates of Growth in travel between 1995 and 2020 for the study area and region are similar.** Total daily person trips in the study area are expected to grow from 3,180,000 to 4,950,000 between 1995 and 2020. This is an increase of 56 percent. During the same period, total daily person trips in the four-county region are expected to grow from 11,231,000 to 17,141,000 trips which is an increase of 52 percent. These increases translate into about a 1.8% increase per year for study area trips and 1.7% for trips in the region as a whole.

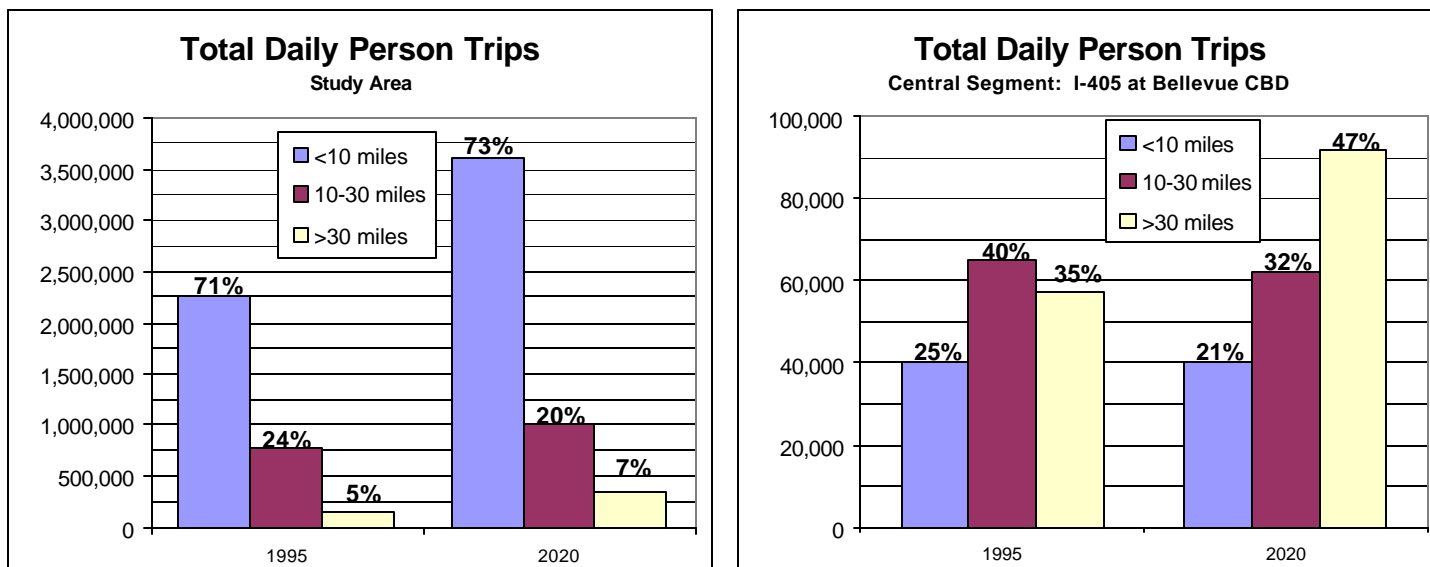
**Work trips to and from home are only about 20% of daily trips.** Today, about 20% of the total daily person trips in the study area are home-based work trips, 39% are home-based other (e.g., shopping, recreational, personal business) trips and 38% are non home-based trips (e.g., traveling from work to daycare or shopping). Other trip purposes include school trips (2%) and commercial vehicles (11%). The relative shares of each trip purpose are expected to be similar in 2020. The relatively small share of trips which are purely home-to-work or work-to-home trips reflects the fact that people increasingly are linking their trips, stopping on the way home to shop, pick up children, etc.(which are considered non home-based trips).

**Over half of all study area trips both begin and end in the study area.** Currently, 55% of all study area-generated trips both begin and end in the study area. The remaining 45% of trips have only one trip end in the study area.

**Only about 15,000 daily person trips are estimated to pass through the study area using I-405.** This is less than 1% of total daily travel on I-405. I-5 is the primary travel corridor for major north-south “through” trips in the study area.

**Trip lengths on I-405 are longer than the average for the study area.** As shown in **Figure 3**, over 70% of trips within the study area are less than 10 miles in length. Conversely, trip lengths on I-405 are longer than for the study area, with over 35% of trips being greater than 30 miles in length. I-405 trip lengths are also much longer than trips on parallel arterials within the study area.

**Figure 3: Total Daily Person Trips by Trip Length**



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## Chapter 3: Current System Usage and Management

This chapter summarizes transportation facilities and travel conditions in the I-405 corridor. A discussion of various travel modes in the study area, including transit, non-motorized facilities, and freight usage, follows the description of general roadway characteristics. In addition, recent data profiles traffic conditions along the corridor, including daily volumes, personal carried per day, and average vehicle occupancy and accident history. The chapter closes with a brief overview of transportation demand management programs active in the corridor.



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### Roadway Network

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#### I-405 Facility

The roadway network within the I-405 study area reflects local geography and the development patterns that have occurred over the years. The relatively sparse roadway network in the I-405 study area creates the demand for the higher capacity state highways (e.g. I-405, I-90, SR 520, SR 522) to frequently serve as the principal means of transportation, even for non-regional trips. Other major arterials also become heavily congested as the area's population and employment grows.

Interstate 405 is the transportation backbone of the primary study area, beginning at I-5 in Tukwila and ending in the north at I-5 outside Lynnwood. It is the designated military route through Seattle, with Interstate 5 having been deemed too constricted. Interstate 405 varies from six to ten lanes along the 30-mile corridor (see **Figure 4: I-405 Physical Characteristics**). The section of I-405 from I-5 in Tukwila to I-90 includes two general purpose lanes and an HOV lane in each direction with 4 to 10 feet shoulders. The next section from I-90 to SR 522 in Bothell is provided with three general purpose lanes and an HOV lane in each direction except for the northbound direction between SR 520 and NE 70<sup>th</sup> where it has one additional auxiliary. On the section north of SR 522, I-405 has two general purpose lanes in each direction. An HOV lane in each direction, between SR 522 and SR 527 in North Bothell, are due for completion in summer, 1999. HOV lanes between SR 527 and I-5 in Lynnwood will be constructed over the next four years.

There are 25 interchanges on I-405 including the connections with I-5. Sound Transit has plans to provide six direct-access connections from the center roadway HOV lanes in Bellevue, Kirkland, and Renton.

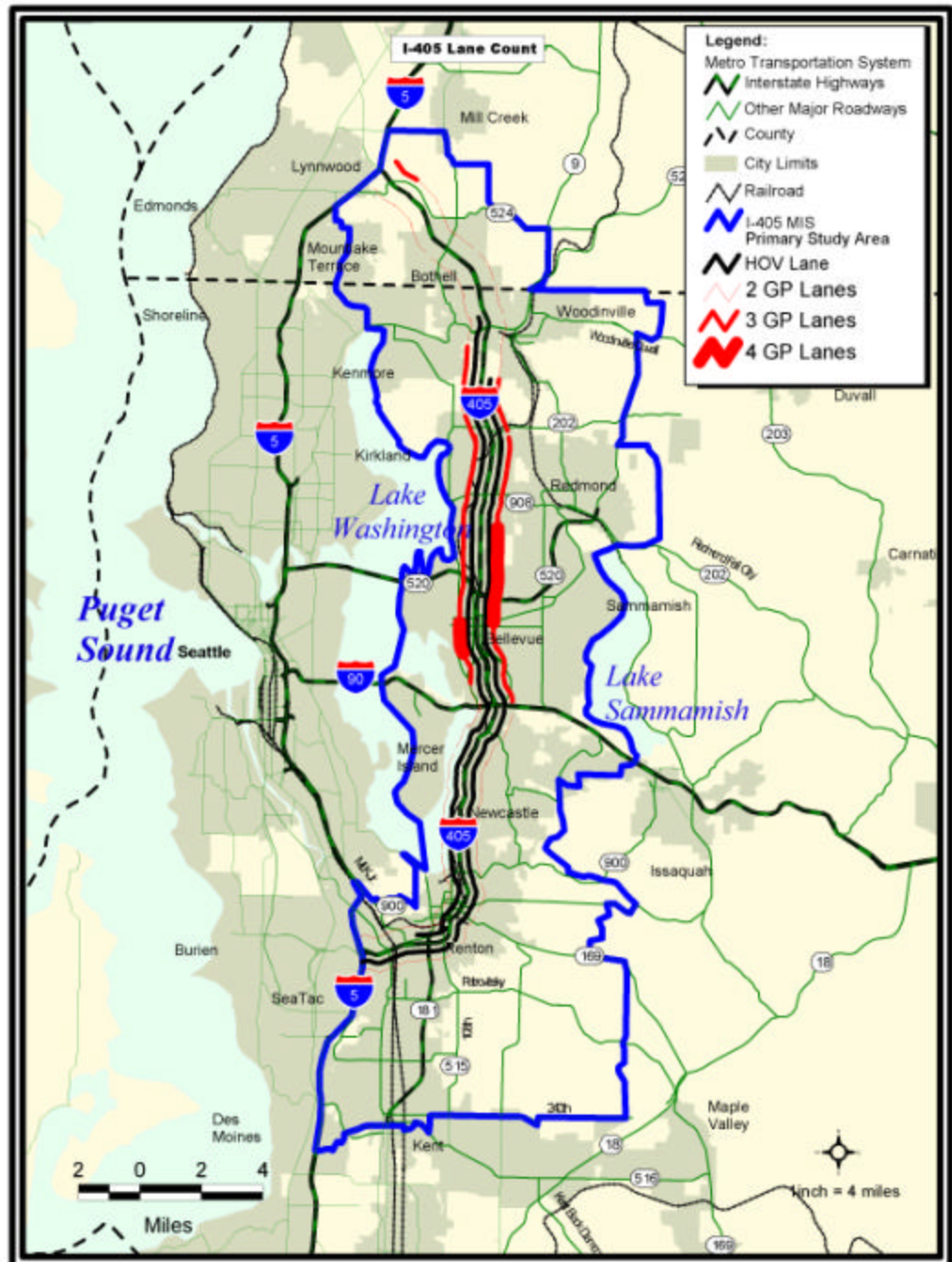
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### Supporting Roadway Network Characteristics

The roadway network supporting I-405 consists of freeways and surface streets intersecting with or paralleling I-405. A total of nine state highways connect with I-405 along its length: SR 167, SR 169, SR 181, SR 900 (Sunset and Park interchanges), I-90, SR

520, SR 908, SR 522, and SR 527. At the north end of the study area, I-405 becomes SR 525 in Lynnwood, while at the south end SR 518 is the extension heading west towards SeaTac and Burien. Two other state highways (SR 515 and SR 524) cross but do not connect with I-405. Another highway in the primary study area, SR 202, parallels I-405 between SR 520 and SR 522. Major local arterials include: Woodinville-Duvall Road, Bellevue-Redmond Road, Petrovitsky Road, Richards Road, 148<sup>th</sup> Ave NE, and Coal Creek Parkway.

**Figure 4: I-405 Physical Characteristics**



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## Mode Split

Mode split refers to the modes, or methods of travel that we use to work, shop, or play. Within King County (including the Eastside and Seattle), a Puget Sound Regional Council survey covering the 1994-1997 timeframe reported the following mode split for all daily person trips.

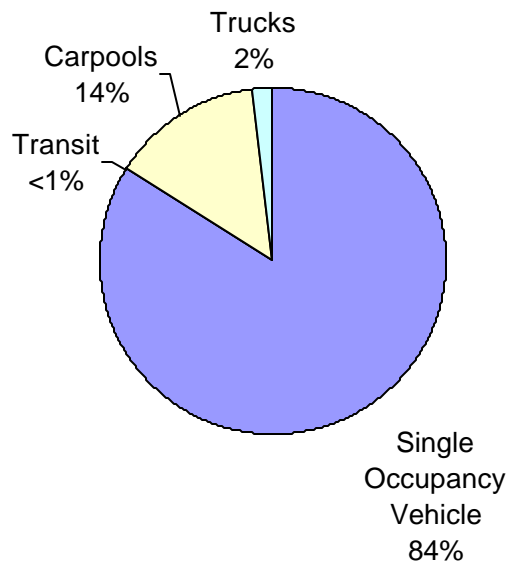
**Table 2: King County Daily Person Trips**

Type of Travel	%
Single Occupant Vehicle	56%
High Occupancy Vehicle (2+)	34%
Transit	4%
Walk	5%
Bike	<1%
Other	<1%
Total	100%

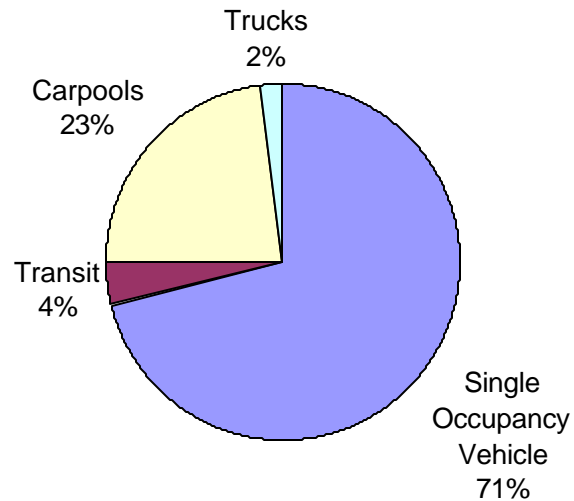
For work trips only in King County, the single occupant vehicle (SOV) share is much higher (73%), HOV is lower (13%), transit is higher (6%), and other modes are about the same.

The mode split for the I-405 study area portrays a different picture. A quick look at 1990 census data for I-405 study area cities indicates that the SOV usage for work trips is up to 5% higher than the county average, while HOV and walk/bike percentages are lower.

**Figure 5: Vehicle Mode Split (PM Peak Hour at NE 85<sup>th</sup> Street)**



**Figure 6: Person Mode Split (PM Peak Hour at NE 85<sup>th</sup> Street)**



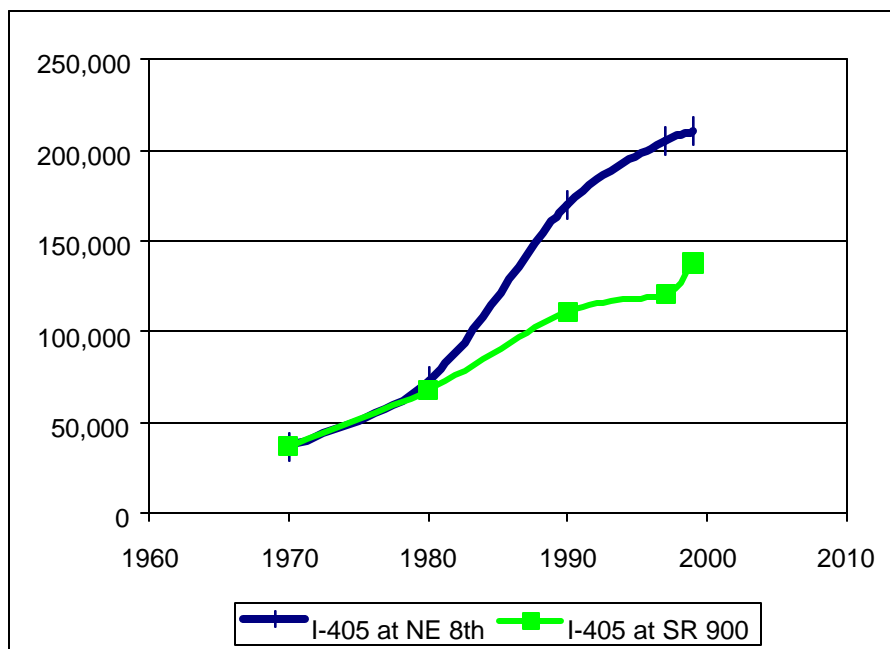
**Figures 5 and 6** show the existing vehicle and person mode splits for the evening peak hour along I-405 itself, in the vicinity of downtown Kirkland. Single occupant vehicles comprise 84% of all vehicles at this location, while buses and carpools constitute 14%, and trucks account for 2%. Buses and carpools (considered "high occupancy vehicles" or "HOVs") carry 27% of all people who travel in that section of I-405 during the peak hour.

## Traffic Growth on I-405

The *Technical Report: I-405 Multimodal Corridor Project (April 1998)* shows the traffic growth trends from 1970 to 1996 throughout the corridor. In 1970, I-405 carried 20,000 to 40,000 vehicles per day. While the entire corridor experienced a 400% increase in traffic volume from 1970 to 1996, various sections of I-405 show different rates of traffic growth. For example, in 1996, I-405 carried approximately 95,000 vehicles per day in the section from SR 522 north to Swamp Creek, compared to 170,000 in the section between I-90 and SR 520.

**Figure 7** illustrates historical traffic growth, using two points on I-405: NE 8<sup>th</sup> Street in Bellevue, and SR 900 in Renton. The section of I-405 in the vicinity of NE 8<sup>th</sup> Street in Bellevue in 1999 carried about 210,000 vehicles per day, which was recorded as the highest volumes in the corridor. I-405 at SR 900 carried about 138,000 vehicles per day, which is the typical level of traffic volumes in the sections south of I-90.

**Figure 7: I-405 Traffic Growth**



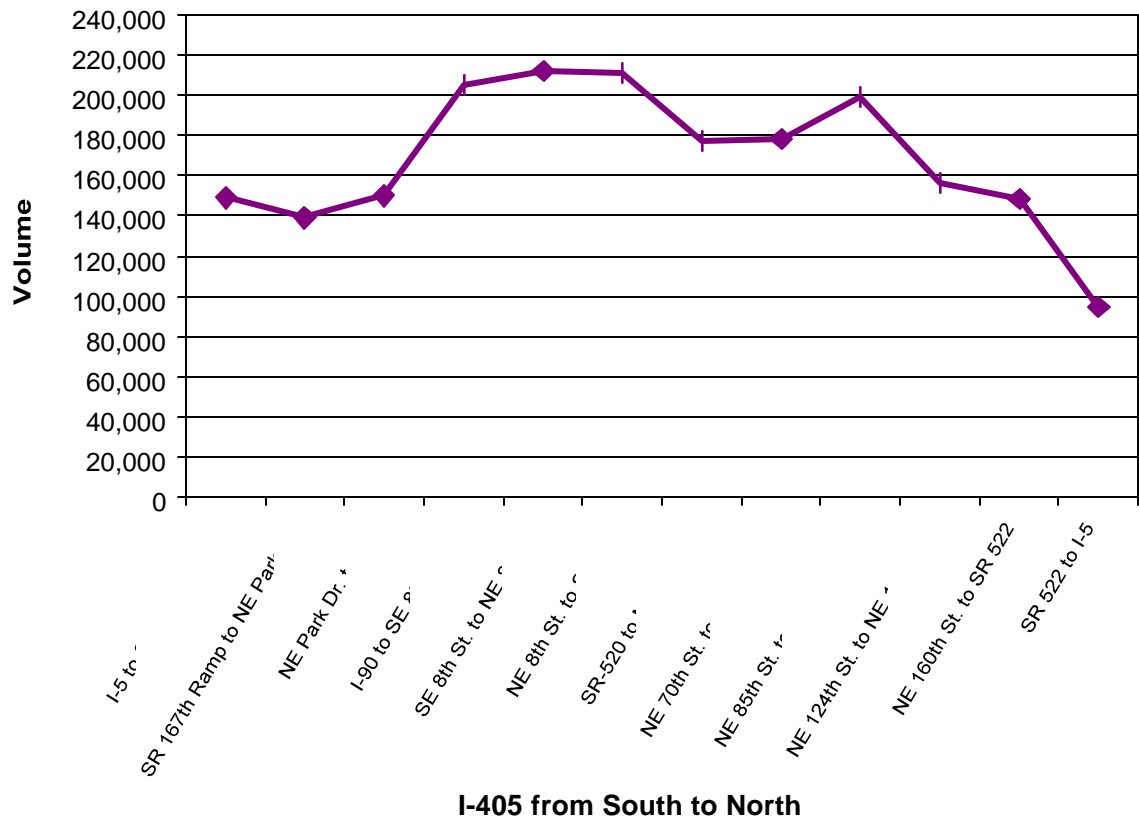
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## Daily Traffic Volumes on I-405

WSDOT's most recent traffic count data (1999, unadjusted) shows the lowest I-405 traffic volumes, 95,000 vehicles per day, in the north end between SR 522 and I-5 at Swamp Creek, and the highest, 210,000 vehicles per day, between I-90 and SR 520. The section south of Kirkland to SR 520 carries 185,000-195,000 vehicles per day, and the section south of I-90 typically carries 150,000 vehicles per day. **Figure 8** shows these findings.

This variation in traffic volumes is the result of different travel demands within the corridor as well as the available capacity on the freeway. As shown previously in Table 2, the total number of freeway travel lanes (both directions) along I-405 varies from 6 to 9 except in the far north end where there are currently only 4 lanes. If one calculates an average "volume per lane" within the corridor, it shows that I-405 is consistently used at a similar level of demand throughout the corridor.

**Figure 8: 1999 Daily Traffic Volumes on I-405**



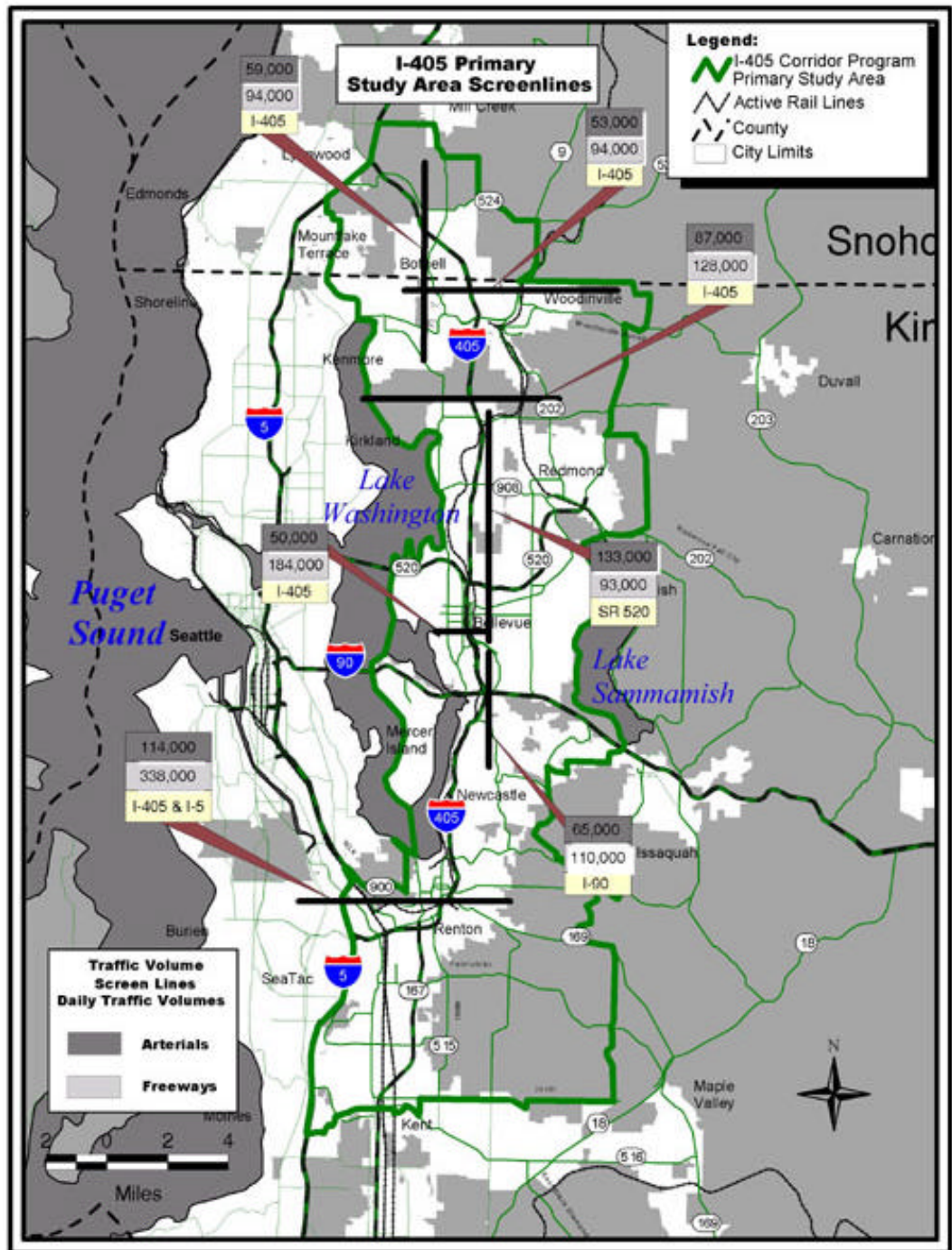
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## Study Area Traffic Volumes

While I-405 carries the highest traffic volumes within the study area, major arterials that parallel or intersect the highway system provide vital roles in carrying regional traffic.

**Figure 9** shows daily traffic (1995 data) that passes through the several screenlines selected for this project in the vicinity of I-405. (A screenline is an imaginary line drawn to cut a group of streets to capture traffic volumes in same direction). The screenline volumes include freeways and arterial streets. As shown in Figure 9, I-405 typically carries 60 to 70 percent of the total screenline traffic volumes in the north-south direction. Conversely, the arterial streets carried 30 to 40 percent. In the east-west direction within the Bellevue/Kirkland area, the arterial street system plays a more important role, with volumes almost equally distributed between the arterial streets and the two east-west freeways, I-90 and SR 520.

**Figure 9: Screenline Traffic Volumes**

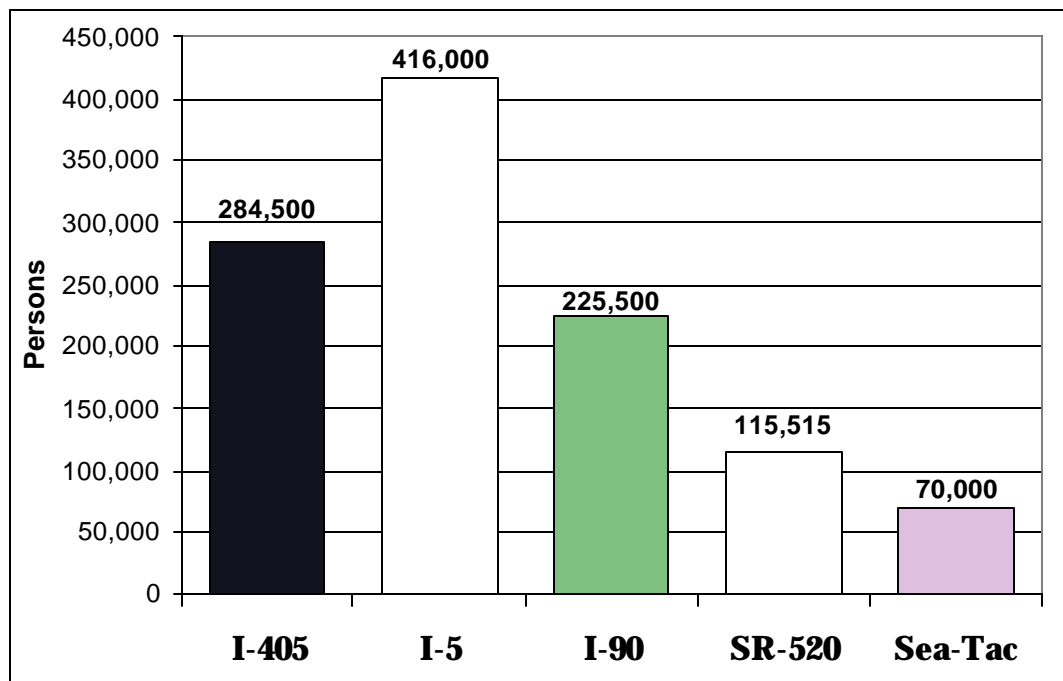


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## Persons Carried Per Day

As shown in **Figure 10**, I-405 carried approximately 285,000 persons per day in the vicinity of SR 520 in 1998 (source: WSDOT Traffic Data; Mirai Associates). This figure is higher than I-90 or SR 520 but less than I-5. Interestingly, another Sea-Tac airport major transportation facility handled about 70,800 persons per day in 1998.

**Figure 10: 1998 Person Throughput for Major Freeways and Sea-Tac Airport (Total Persons per Day)**



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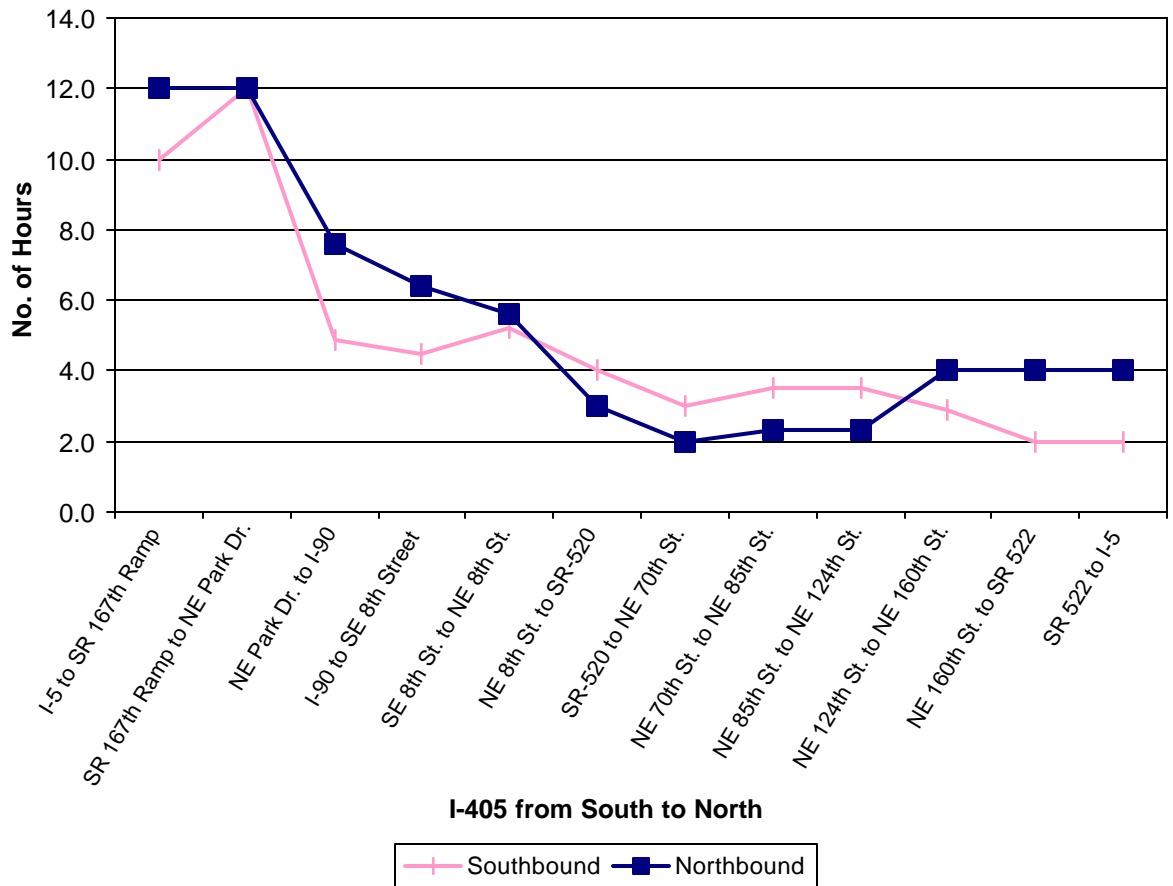
## Congestion

### I-405 Congestion

Traffic congestion along I-405 is widespread during the morning and afternoon peak periods and has spread to surrounding time periods. A useful way to examine daily congestion is to look at the number of hours during which a facility is congested. For purposes of this analysis, "congestion" on the freeway is defined as travel speeds below 45 mph.

**Figure 11** illustrates the severity of traffic congestion that was present in 1997 at 12 points along I-405. The duration of traffic congestion in the northbound and southbound directions is roughly the same. The most congested area of I-405 is from I-5 in Tukwila to NE Park Drive in the City of Renton. Traffic congestion for 10-12 hours a day is typical in this section. For most other sections, traffic congestion lasts 2 to 7 hours a day.

**Figure 11: Hours of Traffic Congestion on I-405**



What causes this variation in congestion? As discussed previously, the average daily “volume per freeway lane” is quite consistent throughout the corridor. Therefore, traffic volumes alone do not cause congestion. The most likely reason for the high hours of congestion in the south end of I-405 relates to freeway “friction” caused by curving geometrics (e.g. the “S-Curves”), grades (e.g. Kennydale Hill), and complex interchanges at I-5 and SR 167. These factors will be examined in detail in the environmental studies.

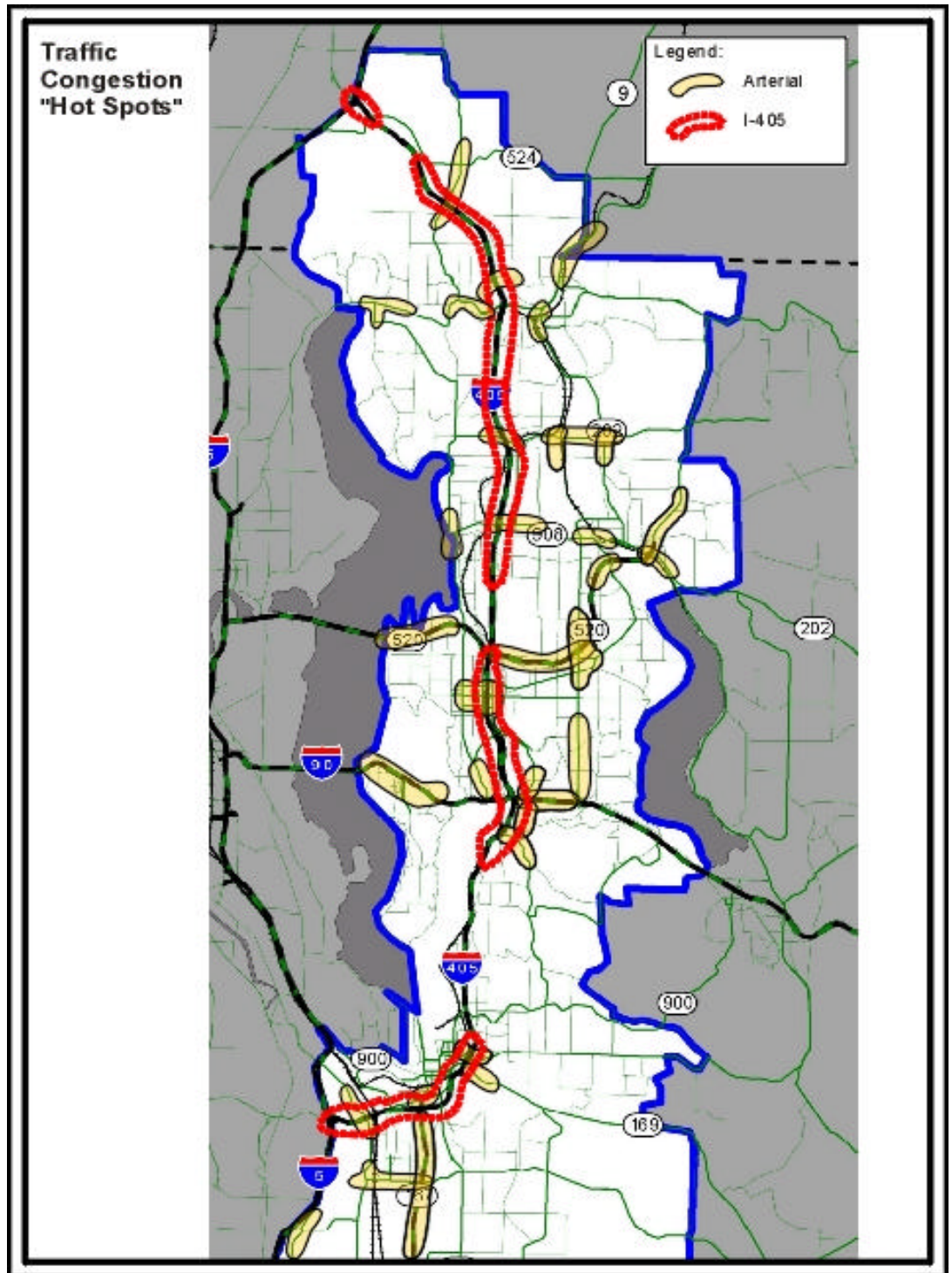


## Study Area Congestion "Hot Spots"

The I-405 study area contains several locations with recurring congestion "hot spots" during the morning and afternoon peak periods. **Figure 12** illustrates several of these hot spots, which are based upon traffic data and observations from agencies throughout the corridor.

Most of the congestion "hot spots" occur on major arterial routes connecting to the freeway system (e.g. I-405, SR 520, I-90, SR 167) and within major urban centers throughout the corridor. It is not surprising that many of the congested arterial segments are in close proximity to congested segments of I-405.

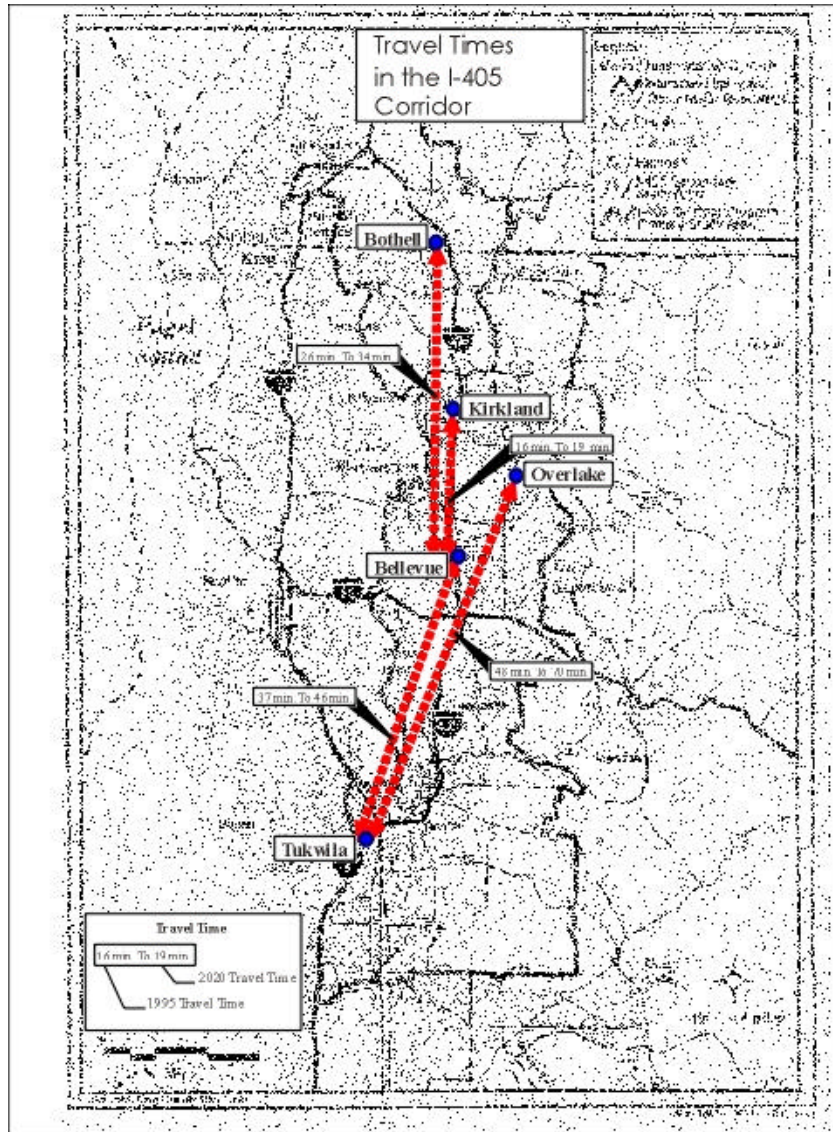
**Figure 12: Traffic Congestion “Hot Spots”**



## Travel Times

**Figure 13** illustrates projected changes to evening peak travel time on I-405 between 1995 and 2020. For example, to travel from the Bellevue CBD to Bothell, it takes about 26 minutes today to go 10 miles, and by 2020, it would take 34 minutes. From Overlake to Tukwila, it takes about 48 minutes today and it would take one hour and 10 minutes in 2020. The average travel time for evening peak hour trips that have origins and destinations in the Eastside in 1995 will increase from 26.6 minutes to 36.2 minutes, a 36 percent degradation. For the solo commuter these increases in travel time equate to an additional six to eight working days a year stuck in traffic for 10 mile trip, to three to four weeks a year for longer trips.

**Figure 13: Existing and 2020 Travel Times**



Source: MCP Technical Report- 1998

## Average Vehicle Occupancy

Average vehicle occupancy is one measure of the person-carrying efficiency of a roadway. As shown in **Table 3**, the northbound HOV lane on I-405 at NE 124<sup>th</sup> Street carry an average of 2.6 persons per vehicle in the evening peak hour, and the southbound HOV lane carry an average of 2.8 persons per vehicle in the morning peak hour. In comparison, the I-5 HOV lanes carry average vehicle occupancies exceeding 3.0. The HOV lanes on SR 520 carry much higher average vehicle occupancies (4 to 11 persons per vehicle) than other freeways due to its 3+ person carpool rule. The vehicle occupancy figures for the I-90 HOV lanes ranged from 2.0 to 2.5 persons per vehicle, but the numbers are not comparable because single occupant vehicles from Mercer Island can also use the HOV lanes.

**Table 3: Average Vehicle Occupancy (I-405, SR 520, I-90, and I-5)**

Freeway	Location	Travel Direction	Peak Hour	General Purpose Lanes		HOV Lanes	
				# of Lanes	AVO	# of Lanes (HOV Rule)	AVO
<b>I-405</b>	<b>NE 124<sup>th</sup> St.</b>	<b>Southbound</b>	<b>AM</b>	<b>3</b>	<b>1.0</b>	<b>1 (2+)</b>	<b>2.8</b>
<b>I-405</b>	<b>NE 124<sup>th</sup> St.</b>	<b>Northbound</b>	<b>PM</b>	<b>3</b>	<b>1.2</b>	<b>1 (2+)</b>	<b>2.6</b>
I-5	NE 145 <sup>th</sup> St.	Southbound	AM	3	1.2	1 (2+)	3.4
I-5	NE 145 <sup>th</sup> St.	Northbound	PM	4	1.2	1 (2+)	3.3
SR 520	Hunts Point	Westbound	AM	2	1.1	1 (3+)	11.0
SR 520	Hunts Point	Westbound	PM	2	1.2	1 (3+)	4.2
I-90	West Channel Bridge	Westbound	AM	3	1.1	2 (2+)*	2.0
I-90	West Channel Bridge	Eastbound	PM	3	1.1	2 (2+)*	2.5

\*Includes general Mercer Island traffic.

## Transit

King County Metro Transit, Community Transit, and Sound Transit supply bus service in the primary study area. Sound Transit is currently planning major transit improvements in the study area that will directly impact the study area and operations of I-405. Significant bus routing changes will occur in 1999/2000 to better serve destinations within the study area, in addition to traditional service oriented to downtown Seattle. New transit centers, park-and-ride lots and bus stops along I-405 will have direct access to the center HOV lanes. In many cases, the addition of the facilities will involve major changes to freeway alignments. In addition, modified Sound Transit Regional Express routes will replace several of King County Metro's transit routes. These new facilities and routes seek to greatly improve bus travel time in the corridor.

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## Transit Routes

**Table 4** shows two-hour morning and evening peak period transit activity along I-405 at various screenlines. The location at Northbound I-405 and NE 85th Street in Kirkland carries the largest number of person trips, northbound and southbound. The Kirkland area generally shows the highest concentration of transit activity.

**Table 4: Transit Routes and Ridership**

Location	No. of Routes	Northbound Riders, 2-hour Morning and Evening Peak Periods	Southbound Riders, 2-hour Morning and Evening Peak Periods
I-405 @ SE 4th	4	177	267
I-405 South of NE 85th	10	827	712
I-405 North of NE 116th	9	753	661
I-405 @ SE 70th	7	368	561
I-405 @ Damson Rd.	3	20	101

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## Transit Facilities

### Park-and-Ride Lot Capacity

King County and Community Transit serve park-and-ride lots located in the study area. There are 26 permanent park-and-ride lots and 32 leased park-and-ride lots in the primary study area, most of which are located in King County. The total number of available park-and-ride capacity is 9,543 spaces, 83 percent of which are placed in the permanent lots.

Although the average utilization among the permanent lots is 84 percent, the parking demands for many of the permanent lots exceed 100 percent. Those lots experiencing more than 100 percent utilization are as follows: Bothell, Brick Yard, Eastgate, Evergreen Point, Mercer Island, South Bellevue, Wilburton, Kent/Des Moines South Renton, Tukwila, and Renton Boeing Lot 6.

The average utilization of the leased lots is 55 percent. Many of those leased lots are relatively small with capacities of less than 50 parking spaces. **Table 5** lists the largest capacity park-and-ride lots with total available parking spaces and percentage of space utilization for January 1999, respectively. All of the park-and-ride lots except the Renton Boeing Lot 6 are permanent lots.

**Table 5: Largest Park-and-Ride Lots - Total Spaces and Utilization**

	Spaces	Count	% Used
<b>North District and Snohomish County</b>			
Canyon Park	292	253	87%
Bothell	230	291	127%
Kenmore	432	401	93%
Northshore	376	147	39%
Woodinville	459	245	53%
<b>East District</b>			
Brickyard Road	247	265	107%
Bear Creek	334	158	47%
Eastgate	678	738	109%
Houghton	450	253	56%
Kingsgate	502	389	77%
Mercer Island	244	248	102%
Newport Hills	292	238	82%
Overlake	395	204	52%
Redmond	344	234	68%
South Bellevue	470	557	119%
South Kirkland	603	552	92%
<b>South District</b>			
Kent/ Des Moines	384	389	101%
Renton Boeing Lot 6	300	305	102%
South Renton	370	372	101%
Tukwila	307	317	103%

Source: King County and Community Transit, January 1999

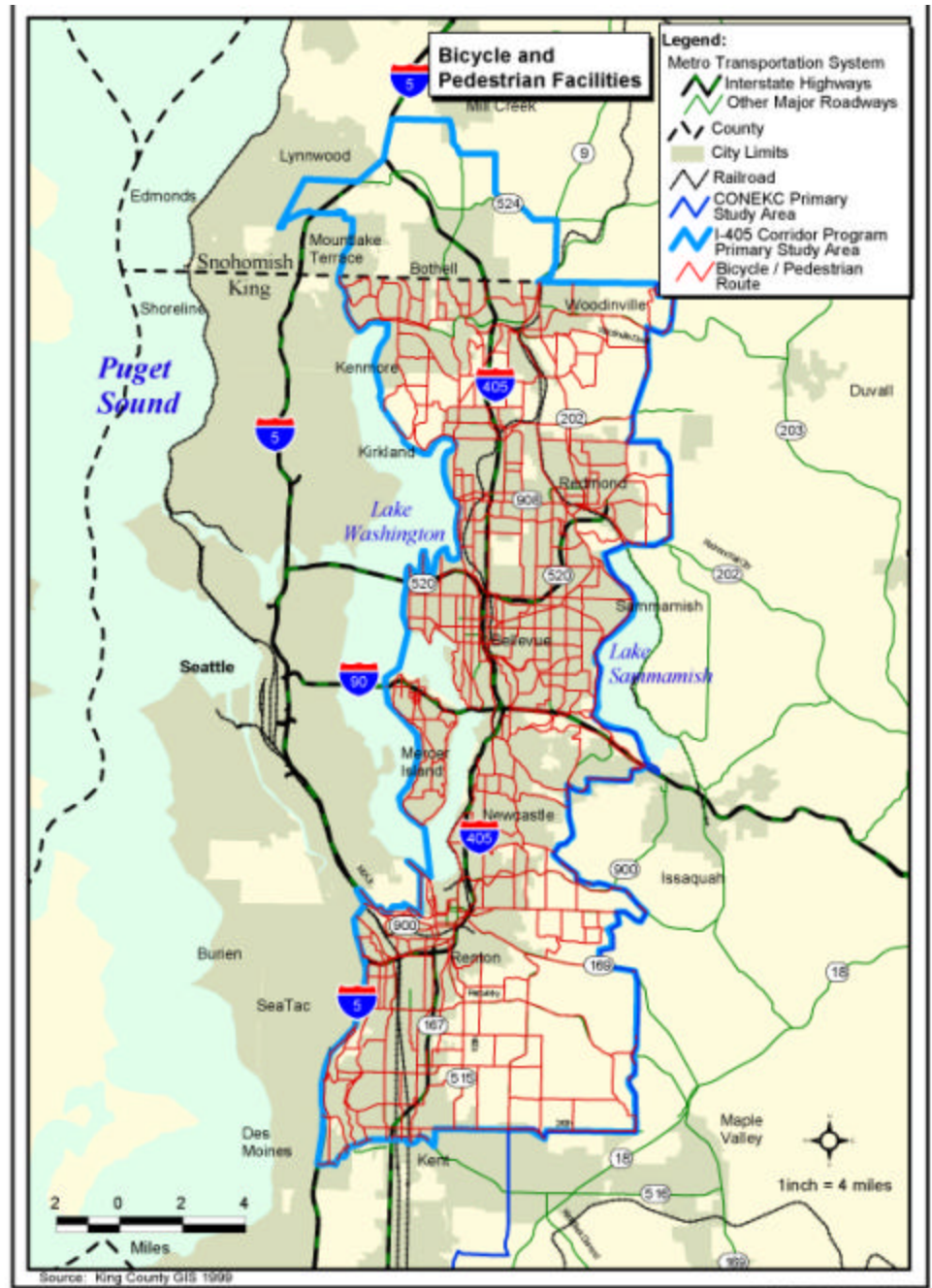


## Vanpools

Vanpools provide additional transit services to the corridor. Vanpools generally carry pre-registered commuters from their homes or park-and-rides to their places of work. An average vanpool carries about 9 passengers per trip. Approximately 159 vanpools travel along some part of the I-405 corridor with an estimated ridership of 1,430 riders per day.



**Figure 14: Bicycle and Pedestrian Facilities**





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## Non-Motorized Facilities

The bicycle and pedestrian facilities in the study area include dedicated trails, sidewalks, and bike lanes. **Figure 13** shows major study area facilities which emphasize non-motorized usage. Long commute trips by non-motorized modes can be problematic due to the lack of north-south arterials, topography, and transportation infrastructure like highways and cul-de-sacs. However, walking and bicycling accounts for up to 5% of total daily trips in the study area. To accommodate the bicycling demand, King County's entire bus fleet was equipped with bicycle racks that can carry two bicycles in 1994. Metro estimates that their buses transport 465,000 bikes a year. Another program King County and Community Transit offer to combine biking with transit provides bike racks and lockers at park-and-ride lots and transit centers.

There is currently no existing document or data on pedestrian and bicycle deficiencies area-wide. However, discussions with King County bicycle and pedestrian planners have identified that I-405 itself is often a major impediment to non-motorized connectivity.



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## Freight Movements

The central Puget Sound region serves as an important freight gateway to Pacific Rim countries. Automobiles, forest and agricultural products, communications and computer equipment and hundreds of other items continuously move over the region's roadways, and railroads, to seaports and airports.

I-5 and I-405 handle between 10,000 and 20,000 trucks per day in a north-south direction. Of these, 75 to 90 percent moves by I-5, with 10 to 25 percent going by way of I-405. In 1997, the I-405 corridor carried an average of 3,200 trucks per day, 2,700 of which originate or terminate within the Interstate 405 study area. Trucks constitute from 1 to 4 percent of the total traffic with an average of 3 percent along the I-405 corridor. Heavier truck volumes on the south end of I-405 indicate significant truck movements between SR 167 and I-5 in the Kent Valley to and from I-90.

Freight activity along I-405 translates into approximately 16.9 million tons of cargo moving along the corridor in 1997, with 14.2 million tons of cargo (12 percent of the total King County freight movement) originating and terminating within the I-405 study area. Overall, I-405 carries approximately 5% of the goods by value transported within the state, which is about half of the total value carried by I-5 through Seattle.

Steadily rising traffic volumes are causing rapidly increasing roadway congestion which creates an ever-growing time delay and operating cost burden to the affected trucking companies. The results of the mail survey of trucking companies using the I-405 corridor tend to verify these observations. Trucking companies tend to avoid using I-405 except where necessary to make local deliveries on a "just-in-time" basis because of the perceived and actual traffic congestion problems. These traffic congestion problems have caused the transit times for "just-in-time" delivery systems to eastside businesses to

increase along the Interstate 405 corridor, which has placed added time and cost burdens upon affected eastside businesses.

Another concern along the Interstate 405 corridor, as well as its extremities, is the perceived need for additional infrastructure to increase truck moving capacities. Exclusive freight facilities do not exist on the I-405 corridor with the exception of the northbound truck climbing lane between SR 520 and NE 70<sup>th</sup> Street.

Finally, the growing demand for real estate in proximity to employment centers on the eastside is causing continuing increases in the price of real estate in proximity to the study area. The result is that it is becoming increasingly difficult for businesses needing trucks to be located near I-405 because they are increasingly pressed to compete with high priced real estate demands. As a result, there has been a shift of these businesses to outlying areas with less expensive land.



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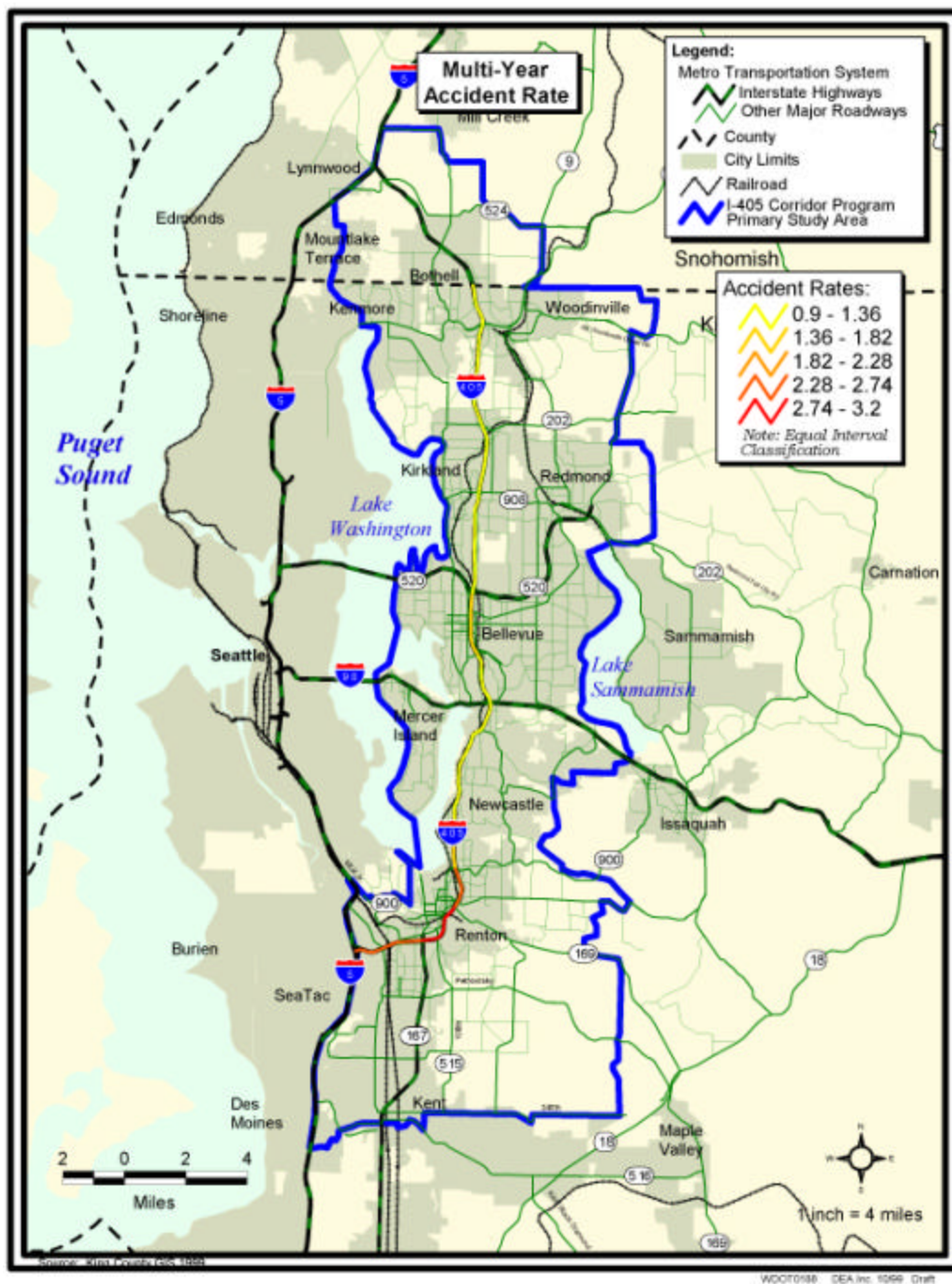
## Safety

The overall accident rate along I-405 (1.6 accidents per million vehicle miles) is about midrange among other freeways in King County. The rates are lower than the average rate for all state highways (1.88 accidents per million vehicle miles, or MVM) and for state highways in King County (2.27 accidents per million vehicle miles). On comparable local freeways, I-5 and SR 520 both exhibit accident rates of about 2.0 accidents per MVM.

I-405 does have accident problems, however. Over the three-year period from 1994 to 1996, a total of 5,580 accidents were reported along I-405. Most collisions occurred on the mainline freeway, with about one-fourth of all accidents occurring on the ramps, collector-distributor roads, and cross streets at the interchanges. About half of all collisions involve property damage only, while half involve injuries or fatalities. This injury pattern applies equally to the mainline and ramp segments, however, all seven fatalities reported in this period occurred on the I-405 mainline.

Twenty-nine of the 280 high accident locations in King and Snohomish are located along I-405. Most high accident listings are associated with ramps connecting to I-405, including those at SR 181 (Interurban), SR 169, SR 900 (Sunset and Park), Coal Creek Parkway, SE 8th St., NE 4th St., NE 8th St., SR 908 (NE 85th St.), NE 116th St. NE 160th St, and SR 527. **Figure 15** shows accident rates along I-405. The portion of I-405 north of SR 527 is identified as a high accident “corridor”, due to the relatively higher speeds and consequent injuries associated with accidents in this segment.

### Figure 15: Accident Rates Along I-405



WSDOT's ramp metering program on I-405 has been very successful. Rear-end and sideswipe accidents have decreased by 60% to 70% near locations with ramp meters.

The accident survey also included many arterial and collector streets that connect with I-405 or provide parallel travel routes. For State roads serving as surface arterial routes, accident rates fall primarily into a range of 3 to 5 accidents per MVM. This pattern is related to the presence of traffic signals, driveways, pedestrians, and bicyclists, and lower levels of access control. Again, these levels of accident rates are typical of urban arterial facilities. Accident rates for selected arterial and collector routes in the primary study area generally range between 2 to 4 accidents per MVM, with some streets higher. These streets typically experience higher accident rates due to the presence of signalized intersections, driveways, and other conflicts.



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## Transportation Demand Management

Transportation Demand Management (TDM) seeks to reduce the need for new transportation facilities by reducing the number of vehicles on the road during peak congestion periods. Implementation of the Commute Trip Reduction (CTR) act represents the most systematic approach to TDM within the I-405 corridor. In addition to the CTR law, Washington State offers several subsidies and incentives for companies and their employee to practice transportation demand management. King and Snohomish Counties offer employers an array of services and products to encourage ridesharing and transit use.

The Cities in the I-405 corridor study area have implemented strategies in addition to the transportation demand management requirements mandated by the CTR law. All of the cities impose conditions on development that either restrict parking spaces or require carpool and vanpool parking spaces. Some cities have parking management programs, and several have linked pedestrian and bicycle facility requirements to demand management objectives.

Employers in the I-405 study area are using the following transportation demand management strategies:

- Provision of preferential parking for high-occupancy vehicles;
- Provision of commuter ride matching services;
- Provision of subsidies for transit fares,
- Provision of vans or vanpools;
- Permitting flexible work schedules to facilitate employees use of transit, carpools or vanpools;
- Permitting compressed work schedules allowing employees to work longer hours in shorter days;
- Provision of bicycle parking facilities, lockers, changing areas, and showers for employees who walk or bicycle to work;

- Provision of a program of parking incentives such as a rebate for employees who do not use the parking facilities, Establishment of a program to permit employees to work part- or full-time at home or at an alternative worksite closer to their homes; and
- Implementation of other measures designed to facilitate the use of high-occupancy vehicles, such as on-site day care facilities and emergency taxi service.

## Commute Trip Reduction Survey Results

The Washington State Legislature passed the 1991 Commute Trip Reduction law in an effort to help manage growing traffic congestion. The CTR law requires cities or counties with major employers (those that employ 100 or more full-time employees who begin their workday on two or more weekdays, between 6 and 9 am) within their boundaries to adopt a commute trip reduction ordinance and plan.

The Act sets employer goals for reducing SOV rates at 15 percent by 1995, 20 percent by 1997, 25 percent by 1999, and 35 percent by 2005. Affected employers that do not meet their CTR deadlines or goals, and do not make a good faith effort may be subject to civil penalties from their jurisdictions. Government agencies that meet the criteria for "major employer" must also meet these goals. All of the cities in the I-405 Corridor use the State's model CTR ordinance, with some cities making modifications for individual circumstances.

Results from a 1997 CTR survey (**Table 6**) for King County illustrates the travel modes for sample jurisdictions in the I-405 corridor study area. Affected employers within the Cities of Woodinville and Redmond report the largest reductions in SOV use from 1995 to 1997 at -10.8 and -9.8. Overall, five of the eight jurisdictions show reductions in SOV usage for their affected employers between 1995 and 1997.

**Table 6: 1997 CTR Program Survey Results for King County**

Jurisdiction	Work Sites	SOV	Carpool	Transit	Vanpool	Bike	Walk	Tele-commute	Other	SOV Change 1995-97
		%	%	%	%	%	%	%	%	%
City of Bellevue	50	71.4	17.8	6.8	1.4	0.4	0.7	0.7	0.7	-0.7
City of Kirkland	22	77.5	15.9	2.9	0.6	0.6	0.9	0.7	0.9	-4.3
City of Redmond	33	76.6	15.4	3.1	2.1	0.9	0.9	0.4	0.5	-9.5
City of Woodinville	3	68.2	27.9	0.5	0.0	2.2	0.5	0.6	0.0	-10.8
City of Bothell	13	82.5	13.5	1.0	1.4	0.5	0.2	0.3	0.5	3.8
Unincorporated King County	1	71.8	25.4	0.6	0.0	0.6	0.0	0.0	1.7	-6.4
Unassigned King County	2	91.6	7.3	0.0	0.0	0.2	0.0	0.4	0.4	2.2

Source: Washington Commute Trip Reduction Program, 1995 and 1997 Surveys

Note: No accurate 1997 survey results available for the cities of Renton and Tukwila

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## Chapter 4: Crafting the Response to I-405 Corridor Needs

Engineers have been known to state that any solution can be crafted, given unlimited funds. However, fiscal prudence suggests that any realistic improvements to the corridor will require solid information as to physical and environmental constraints. Existing physical conditions such as right of way constraints, maintenance requirements and operational considerations will affect the feasibility, configuration, and cost of any modifications within the primary study area, as will regulatory requirements for environmental protection. This chapter examines the current roadway, operational, and environmental conditions that will influence the development of an I-405 corridor strategy.

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### Roadway and Operational Conditions

Design Conditions along the I-405 corridor for the mainline, ramps, and adjacent arterials fall into several categories, including channelization, access control, maintenance problem areas, operational problem areas, and right of way. The existing conditions were evaluated against current Washington State Department of Transportation design criteria. The result of using original design standards from the late 1950s and early '60s, combined with extensive reconstruction, has led to significant deviations from current criteria. When modifications are made to the interstate system, the Federal Highway Administration (FHWA) will likely expect WSDOT to meet current design standards.

Key findings are summarized in **Figure 15** and include:

Most of the corridor does not meet a 10-foot minimum shoulder width, thereby providing substandard space for emergency and disabled vehicles.

Some roadway sections and ramps have steep climbing grades with no provision for slower vehicles.

The majority of bridge decks within the study area need resurfacing, and the corridor experiences numerous drainage problems.

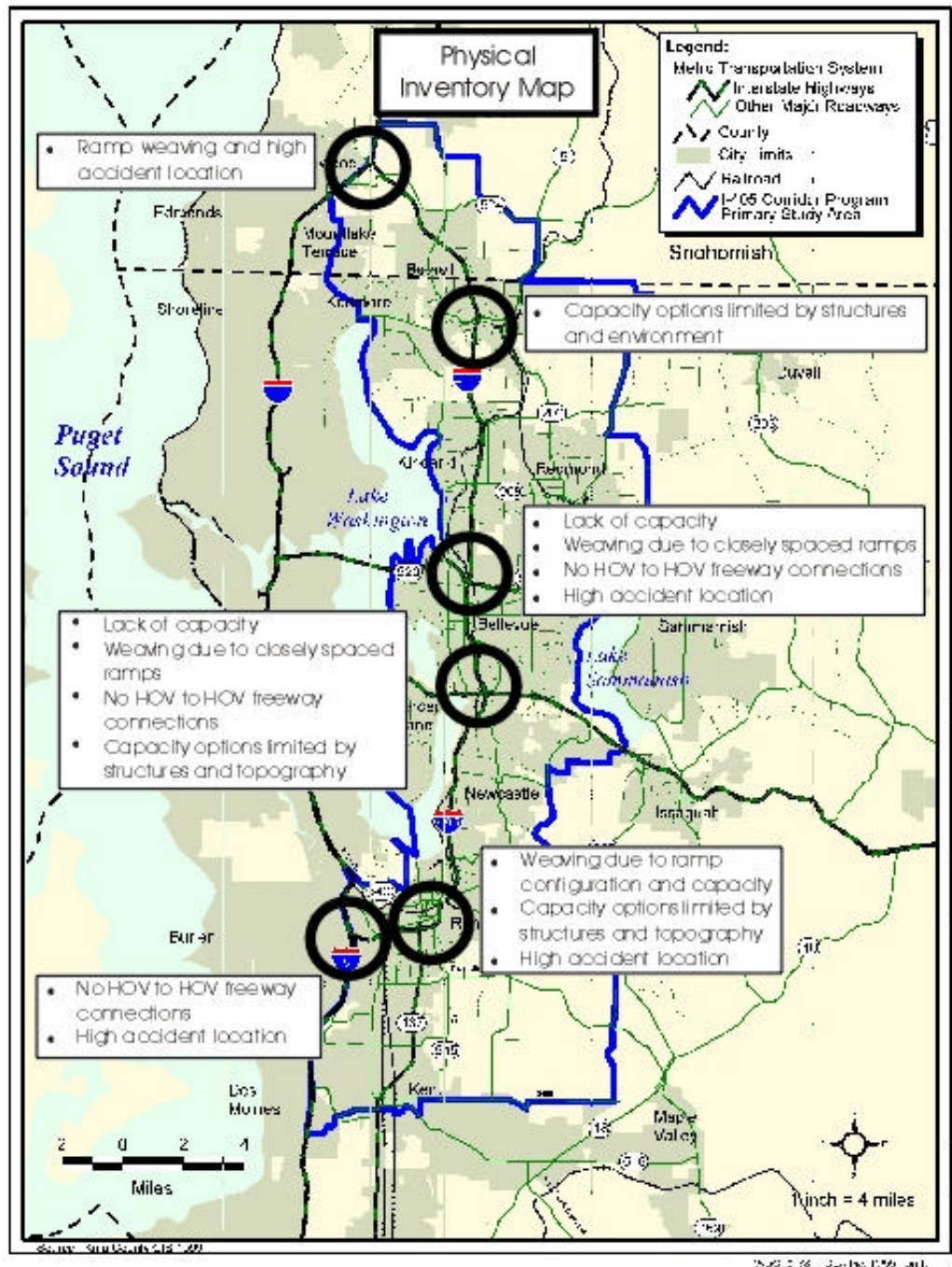
Seven streams parallel or cross I-405 and trigger requirements for a hydraulic permit for maintenance.

Interchange spacing and design cause traffic congestion on I-405 and cross streets.

Many of the curves on I-405 do not meet the stopping sight distance required for a 70-mph design speed, and nearly one-third of the bridges on or crossing I-405 do not provide standard 16.5-foot clearance.

13 of the 23 interchanges have intersecting streets within 350 feet of the ramp terminals resulting in a lower level of service.

**Figure 16: Roadway and Operational Conditions**





Right of Way constraints will have significant impacts on the ability to potentially widen the freeway, as follows:

- 13 of the 23 interchanges would need additional right of way for the ramps if the mainline was widened to add one lane in each direction.
- Approximately 22% of the right of way on the I-405 corridor is abutted by developed commercial areas.
- Approximately 25% of the right of way on the I-405 corridor is abutted by developed residential areas.
- Sufficient right of way exists in various areas along the corridor for mainline widening, but noise walls and large trees would have to be removed and replaced.

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## Environmental Conditions

Mapped environmental conditions along the I-405 corridor include wetlands, critical areas, water resources, fish-bearing streams, land use designations, parks, recreation areas and trails, and historic resources. The 1999 King County GIS database and the David Evans and Associates GIS system provide much of the baseline information for these, supplemented by local comprehensive plans and land use maps.

Natural systems within the I-405 corridor such as wetlands, streams, water bodies, wildlife migration corridors, and other upland habitats have been substantially modified due to urbanization of the area. Protection and/or avoidance of these natural systems and remaining upland and aquatic habitats are vital to the environmental health of the area, and will affect the feasibility and cost to construct improvements within the I-405 corridor. **Figure 17** provides a snapshot of currently identified environmental conditions. A more full picture of these natural systems as well as the built environment will be developed prior to alternatives analysis and detailed evaluation.

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## Air Quality

Air quality in the Puget Sound region has been improving in recent years because of improvements in vehicle technology, and is generally good. However, air quality is projected to worsen as we move into the next century.

The I-405 corridor is located in the Puget Sound carbon monoxide (CO) and ozone maintenance areas. CO and ozone are two air pollutants caused largely by transportation sources. Air quality maintenance areas are regions that have recently attained compliance with the National Ambient Air Quality Standards (NAAQS). Pollutant emissions in the region are managed under the provisions of Air Quality Maintenance Plans (AQMP) for CO and ozone. The Washington State Department of Ecology and the Puget Sound Clean Air Agency (formerly PSAPCA) have established air pollution monitoring stations throughout Washington state. No exceedances of the



NAAQS for CO have been monitored since 1995; two exceedances of the ozone standard occurred in 1994 and one in 1998.

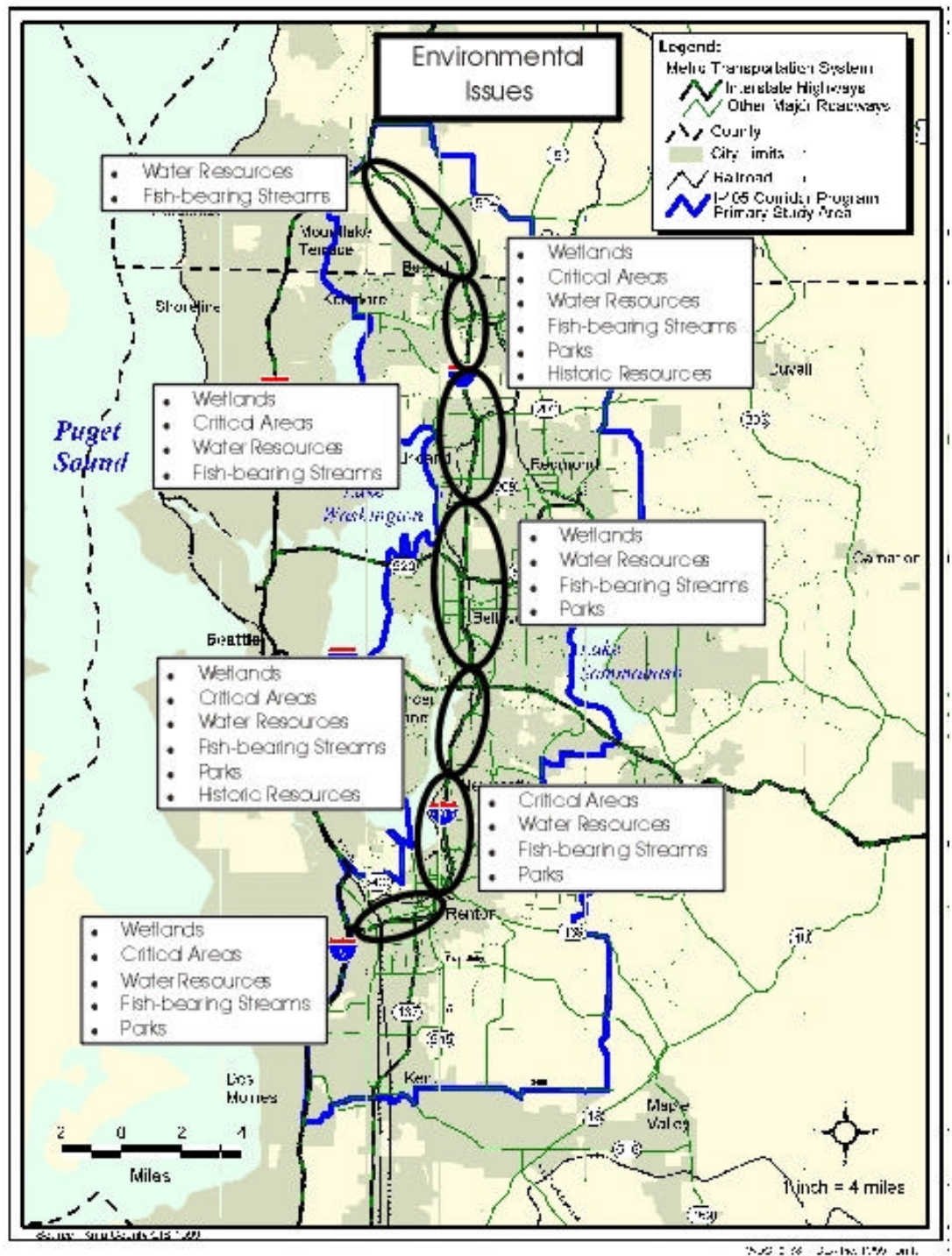
Current congestion in the I-405 corridor contributes to air pollution in the Puget Sound Region. CO, nitrogen oxide and hydrocarbon emission estimates were about six times the regional average for the I-405 segment from SR 520 to Totem Lake (PSRC "Baseline System Performance Report", Page 47, May 1998). Corridor-wide emissions index ratings range from over three to six times the regional average for the three pollutants. Improvements to the corridor would affect pollutant emissions; increases in traffic volume would result in increased emissions, while a reduction in congestion would decrease emissions.

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## Wetlands

Wetlands provide fish and wildlife habitat; hydrology and groundwater recharge; storm- and floodwater storage and retardation; and water quality protection and purification. The Federal and State governments have a "no net loss" policy concerning wetlands that extends to both overall acreage and function. Project proposals must demonstrate that all practicable measures have been incorporated to avoid disturbance of wetlands. After meeting this criterion, reasonable measures must be proposed to minimize, rectify, and compensate for potential remaining impacts. Wetlands exist throughout much of the corridor study area, with several near the interstate in Bothell, Bellevue, and Renton. Comprehensive maps will be created for alternatives development and detailed evaluation.

**Figure 17: Environmental Issues**



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## Critical Areas

King County's GIS database identifies critical areas as seismic hazard areas and areas prone to landslides. Preliminary review shows that seismic hazard areas exist adjacent to I-405 in the northern portion of the study area outside of Snohomish County and in the southern portion of the study area outside of the valley floor. Slide areas exist east of the I-405 corridor along the Sammamish River, southwest of Lake Sammamish, and along the Cedar River, Soos Creek, and adjacent to I-5. A complete inventory will be developed prior to the environmental review process.

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## Water Resources, Water Quality and Fish-Bearing Streams

The Endangered Species Act (ESA) of 1973 requires each Federal agency to ensure that its actions do not jeopardize the continued existence of any Federally listed threatened or endangered species or adversely modify the habitat of such species. I-405 does not meet current standards for treating storm water runoff. The recent listing of salmon under the Endangered Species Act requires consideration of retrofitting the entire corridor to assure runoff does not degrade stream systems for migrating salmon. The requirements for detention systems will be costly. Water resources and stream courses are mapped here as an indication of the reach of potential issues related to compliance with the ESA. Streams and rivers that may provide habitat for Federally listed salmon and trout species abound throughout the study area, the largest of which include Swamp Creek, North Creek, the Sammamish River, Mercer Slough, Coal Creek, May Creek, the Cedar River, and the Green River.

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## Parks, Recreation Areas, and Trails

State and Federal laws restrict the transportation uses of public lands acquired for parks, recreation, wildlife or waterfowl refuge, or historical preservation. In instances where no alternative exists, the laws require steps to minimize harm or, in the case of some recreation properties, substitution of equivalent property. These restrictions do not apply to privately owned facilities, except for historic resources, even if such facilities are open to the public. The I-405 Corridor contains numerous parks and trails, many of which will be subject to these restrictions. Alternatives development and detailed evaluation will require a complete inventory of these lands.

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## Chapter 5: Plans and Programs

Existing studies, plans and projects in the I-405 Corridor Program study area will have varying degrees of influence on the preferred alternative for the corridor. **Table 7** identifies a number of recent or ongoing regional, subregional, or corridor studies and plans relevant to I-405. In addition to the recent I-405 Multimodal Corridor Plan, the others described below will probably have the greatest inter-relationship with the I-405 Corridor Program.

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**Table 7: Studies and Plans Relevant to I-405 Corridor Program**

<b>Plan</b>	<b>Purpose</b>	<b>Policy Focus</b>	<b>Next Update</b>
Washington's Transportation Plan	20-year funding targets for improvements to the state-owned and state-interest facilities and modes of transportation, including state highways, state ferries, state airports, public transportation, inter-city passenger rail, freight rail, marine ports and navigation, and bicycle and pedestrian transportation	Maintain current systems, improve safety, provide mobility to a growing population, and keep the economy moving	2001
State Highway System Plan	Identify detailed highway improvement projects	Mobility, HOV, safety	Every two years (next?)
Metropolitan Transportation Plan, including 6-Year Transportation Improvement Program	Detailed, long-range strategic plan for future investments in the central Puget Sound region's transportation system	Vision 2020 policies emphasize accessibility by developing and maintaining a safe multimodal transportation system, and the efficient movement of people, information, and goods and freight	MTP: Spring 2001 TIP: 1999
HOV Pre-Design Study	Evaluate concepts for direct access alternatives to connect freeway HOV facilities to urban arterial and transit networks; also evaluate additional HOV links which might be added to the Core HOV network	Core HOV system	completed 1997
Sound Move	Expand existing travel corridors and create new high-capacity transportation (HCT) corridors linking economic centers and communities with regional express bus, commuter rail, and light rail	High-capacity transportation and supporting facilities	Target dates to be determined for Phase II planning and ballot measure
I-405 Multimodal Corridor Project	Identify alternatives for addressing congestion along the corridor	Multi-modal	completed 1998
King County Regional Arterial Network (RAN)	Identify effective road and rapid transit improvements designed to move people and goods safely and efficiently from community to community	National Highway System, State Routes and Principal Arterials	In process

<b>Plan</b>	<b>Purpose</b>	<b>Policy Focus</b>	<b>Next Update</b>
Trans-Lake Washington Study	Identifies a set of "reasonable and feasible" solutions that would improve cross-lake mobility	Multi-modal range of alternative solutions	environmental Studies to commence 1999
SR 522 Multimodal Project	Identify ways to improve safety and people-carrying capacity between I-5 and I-405	Intersection and roadway segment treatments; transit lane and queue jump, transit signal priority; additional sidewalk and pedestrian crossings	To be adopted
ETP MAP	Set transportation priorities based on adopted land use plans to provide mobility of people, freight and goods and attacks peak hour congestion in the East subarea of King County	Arterial and freeway general transportation improvements and HOV system improvements; transit infrastructure improvements; non-motorized and transportation demand management components	completed 1998; updates annually
East King County Corridor Needs Study	Report the general merits and impacts of various transportation strategies for the area east of I-405 to the Cascades	Land use impacts, transportation benefits, cost effectiveness and environmental issues related to various transportation strategies	Late 1999
Trans-Valley Corridor Study	Pre-design and engineering of intersection and arterial improvements; identify future transportation needs	Intersection, arterial improvements; HOV lanes and intersection; transportation demand management	N/A
SR 518/I-405/I-5 Interchange (Route Development Study)	Identify and propose strategies to address deficiencies on SR 99 and SR 518	New interchange on SR 518; Sound Move's plans for light rail along SR 518 or SR 509; preferred HOV connections for HOV lanes on I-405, I-5 and possibly SR 518	N/A
Sound Transit Regional Express	Develop transit and HOV direct connections to I-405 in Bellevue, Kirkland, Bothell, Renton, and Mercer Island	Implement Sound Transit program for transit facility enhancements	Ongoing

Potential solutions for improving mobility in the I-405 corridor could cost billions. Exiting high priority projects among those listed above, including TransLake, ETP's Mobility Action Plan, and Eastside passenger rail will compete for funding. Finding solutions that can be funded will be a challenge. Recommendations from the I-405 Corridor Program will become part of the Metropolitan Transportation Plan and State Transportation Plan. These plans are financially constrained and may not be able to include all of the recommended improvements.

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## Chapter 6: Growth Management Act

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### The Growth Management Act

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The Washington State legislature passed the Growth Management Act (GMA) in 1990 and adopted a series of amendments related to transportation facilities in 1998. The purpose of the Act related to transportation is to “encourage efficient multimodal transportation systems that are based on regional priorities and coordinated with county and city comprehensive plans.”

The GMA requires local jurisdictions affected by the Act to prepare a transportation element in their Comprehensive Plan including the following information related to facilities and services needs:

- Level of service standards for all arterials and transit routes by which to gauge performance of the transportation system. Standards “should” be regionally coordinated, but such coordination is not mandated.
- Actions and requirements needed to raise the level of service if it falls below the standard.
- Forecasts of traffic for at least ten years.
- Identification of state and local system needs to meet current and future demands.
- Financing plan, coordinated with the State’s six-year improvement program, that identifies probable funding sources and discusses how funding will be raised or how land use assumptions will be reassessed to ensure that level of service standards will be met if probable funding falls short of meeting identified needs.
- Demand management strategies.

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## Chapter 7: Levels of Service, Concurrency Requirements, and Development Review and Approval

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### Local Transportation Facilities

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After adoption of a transportation plan in the Comprehensive Plan, local jurisdictions are required to adopt and enforce an ordinance linking approval of development to maintenance of the adopted level of service standards. The ordinances must “prohibit development approval if the development causes the level of service on a transportation facility to decline below the standards adopted in the transportation element, unless transportation improvements or strategies to accommodate the impacts of development

are made concurrent with the development.” This provision in the GMA is commonly referred to as “concurrency.”

The GMA clarifies that “concurrent with development” means that facility improvements or transportation management strategies to accommodate the impacts of development are in place at the time of development, or that a financial commitment is in place to complete the improvements or strategies within six years.

## State Transportation Facilities

In 1998, the legislature called for WSDOT, in consultation with local governments, to set level of service standards for state highways and ferry routes of statewide significance. WSDOT maintains authority to make final decisions, but the agency must “consider the necessary balance between providing for the free interjurisdictional movement of people and goods and the needs of local communities using these facilities.” Notably, concurrency requirements do not apply to facilities of statewide significance, such that development approval is not conditioned upon the performance of these facilities.

The 1998 amendments also require local government comprehensive plans to set level of service standards for all state highways (including those of statewide significance) within their boundaries, to:

- monitor the performance of the state highway system;
- evaluate improvement strategies identified by the state and regional transportation plan; and
- facilitate coordination between the local jurisdiction’s six-year street, road, or transit program and WSDOT’s six-year investment program.

However, the 1998 amendments limit local jurisdictions’ ability to identify facility needs, stating that, “identified needs on state-owned facilities must be consistent with the state-wide multimodal transportation plan.”

## Review of the Local Jurisdiction Concurrency Ordinances and Level-of-Service Standards

Each of the jurisdictions located in the I-405 Corridor Program study area have adopted a Comprehensive Plan including a transportation element, and a concurrency ordinance as required by the 1990 GMA. None have yet included level of service standards for I-405. The larger cities and two counties along the I-405 Corridor employ a variety of methodologies to set level of service standards and review development applications for concurrency. System performance in terms of traffic congestion or delay is measured in several ways. Methods to evaluate transportation impacts from proposed development are equally numerous. This situation could create a challenge for the I-405 Corridor Program if one of the alternatives focuses on arterial improvements. Identification of an agreed-to preferred alternative could well set the stage for state, regional and local

jurisdictions to work together to establish a coordinated level of service standard for I-405.

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## Background Report: Summary of Key Findings

The review of background conditions in the I-405 corridor has identified several factors which will influence the development of a long-range transportation strategy. The following findings summarize many of these observations.

PSRC's Vision 2020 and the Growth Management Act have shaped land use decisions. All jurisdictions within the corridor have included Growth Management mandates in their comprehensive plans. I-405 will continue to serve as a major connector for the designated activity centers in the corridor and will be an integral part of the region's transportation system.

More than two-thirds of the total trips on I-405 begin and end within the corridor itself. The remaining one-third have strong ties with the communities along SR 167 and the developing areas to the east. Less than one percent of vehicle trips travel from one end of I-405 go the other.

At a typical location along I-405, the freeway carries about 16% buses and carpools, but these vehicles carry up to 35% of all people who travel in along I-405.

The I-405 study area is undergoing significant growth in population and jobs, which will continue to degrade mobility. The increase is equivalent to adding two more cities the size of Bellevue to the primary study area.

Absent any major investment or change in travel patterns in the corridor between now and 2020, travel delay in the evening peak period will increase 250% on I-405, and 350% on local arterials between 1990 and 2020. Work trips will result in additional delays of six to 20 working days a year for most commuters.

Traffic volumes alone do not cause congestion. On a per-lane basis, traffic volumes are fairly consistent throughout the corridor. However, levels of congestion are persistently worse at the south end of I-405 due to other design and operational factors.

The entire freeway and arterial system is saturated at peak hours. A single peak hour accident on one route can cause system-wide gridlock.

I-405 was conceived in the late 50's and constructed through the 1960's. The result of using original design standards combined with extensive reconstruction has led to significant deviations from current criteria. Standards have changed over time, and many features throughout the 30 mile corridor no longer meet current requirements for vertical and horizontal clearance or alignment. When modifications are made to the interstate system, the Federal Highway Administration (FHWA) expects WSDOT to meet current design standards.



Physical and environmental constraints will affect the feasibility, configuration, and cost of any modifications.

I-405 is a heavily-used transport corridor for local freight delivery to and from the cities along the interstate, but currently does not serve as a north/south regional freight corridor. I-405 carries approximately 5% of all goods volumes in Washington State, roughly half of the volume carried along I-5 within the Seattle area.

Air quality is projected to become worse as we move into the next century. Carbon monoxide, nitrogen oxide and hydrocarbon emission estimates were about six times the regional average for the I-405 segment from SR 520 to Totem Lake (PSRC "Baseline System Performance Report", Page 47, May 1998). Corridor wide emissions index ratings range from over three to six times the regional average for the three pollutants.

I-405 does not meet current standards for treating storm water runoff. The recent listing of salmon under the Endangered Species Act requires consideration of retrofitting the entire corridor to assure runoff does not degrade stream systems for migrating salmon.

The I-405 Corridor Program needs to be sensitive to jurisdictional concerns about concurrency issues that may arise from arterial capacity and performance discussions. Many jurisdictions are bumping into concurrency thresholds, which may influence the location and pace of new development, as well as the funding and implementation of transportation capacity.

Finding solutions that can be funded will be a challenge. Recommendations from the I-405 Corridor Program will become part of the Metropolitan Transportation Plan and State Transportation Plan. Both plans are financially constrained and will need to balance funding for the recommended improvements.

# I-405 Corridor Program: Related Working Papers

<b><i>Paper No.</i></b>	<b><i>Working Paper Name</i></b>
WP #1.....	Public Involvement Plan
WP #2.....	Situational Analysis Results (see WP #1, <i>Public Involvement Plan</i> )
WP #3.....	Research on National Examples
WP #4.....	Critique Decision Framework (see WP #6, <i>Recommended Decision Process</i> )
WP #5.....	Legal Authority of State
WP #6.....	Recommended Decision Process
WP #7.....	NEPA/SEPA Processes; Draft Study Plan
WP #8.....	Benefit/Cost Approach
WP #9.....	Alternatives Analysis Process
WP #10 .....	Travel Forecasting
WP #11 .....	Background Documents, Findings
WP #12 .....	Policies (see WP#26, <i>Plans, Projects and Programs</i> )
WP #13 .....	Community Issues Summary
WP #14 .....	GIS Approach, Base GIS Maps
WP #15 .....	Existing Transportation Conditions
WP #18 .....	Freight and Goods
WP #19 .....	Transportation Demand Management
WP #20 .....	Model Refinement and Validation
WP #21 .....	Travel Market Assessment
WP #22 .....	Engineering Design Conditions
WP #23 .....	Safety
WP #24 .....	Environmental Overview
WP #25 .....	Economic Profile
WP #26 .....	Plans, Projects, and Programs
WP #27 .....	Concurrency Review
WP #28 .....	Intelligent Transportation Systems